Recent Cultural Heritage Issues in Afghanistan

Volume 5

Structure, Design and Technique of the Bamiyan Buddhist Caves

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Volume 5

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Structure, Design and Technique of the Bamiyan Buddhist Caves

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Contents

Foreword vii
Preface ix

Chapter 1 Overview of the research on the Bamiyan Buddhist Caves 1

Chapter 2 Previous studies on the Bamiyan Buddhist Caves 9

Chapter 3 Present condition of the caves on the Bamiyan Great Cliff 13

Chapter 4 Details of the caves on the Great Cliff in Bamiyan 39

Chapter 5 Survey of the caves in the Foladi Valley 203

Chapter 6 Survey of the caves in the Kakrak Valley 211

Chapter 7 The traditional architecture 217

Chapter 8 Architectural features of the Buddhist caves on the Bamiyan Great Cliff 223

Chapter 9 Caves: current situation and site management 257

Chapter 10 Conclusion and perspectives 265

Afterword 267

Appendix 1 269

Appendix 2 275

Bibliography 281

Foreword

After the world was stunned in March 2001 by the Taliban regime's demolition of the two Giant Buddhas at the Bamiyan site in Afghanistan, the site was hastily added to the World Heritage List and the List of World Heritage in Danger. The site's restoration and conservation projects are still being conducted by international specialists in coordination with UNESCO.

Since 2003, the Independent Administrative Institution National Research Institute for Cultural Properties, Tokyo (NRICPT) and the Nara National Research Institute for Cultural Properties (NNRICP) have collaborated on investigations of Afghanistan's archaeological sites and cultural landscapes, including the Bamiyan site, coordinated efforts to list the sites on the World Heritage Lists, and developed many other restoration and conservation projects. Since 2005, their results have been publicly available in a series of publications entitled *Recent Cultural Heritage Issues in Afghanistan*. The present volume is the fifth in this series and reports the result of studies of the Bamiyan Buddhist Caves conducted in November 2005 and September and October 2006.

It is our great pleasure to introduce our conservation activities related to Afghanistan's cultural heritage, as well as the international contributions provided by NRICPT and NNRICP. We hope that Afghanistan will recover from the chaotic situation as soon as possible, and we appreciate your understanding and further support for the efforts to preserve Afghanistan's cultural heritage.

Nobuo KAMEI
Director-General
National Research Institute for Cultural Properties, Tokyo

Preface

It has been 12 years since the two Giant Buddhas at the Bamiyan site in Afghanistan were tragically ravaged in March 2001. Since then, international specialists from Japan, Germany and Italy, under the auspices of UNESCO, have continuously cooperated with each other to support the conservation projects to preserve the cultural heritage in Bamiyan. As one component of this larger work, NRICPT and NNRICP have carried out the project of safeguarding the Bamiyan site since 2003.

As the most important security tasks, such as the reinforcement of the cave-niches and removal of landmines, were completed with some positive results, we have now launched a more comprehensive scheme that includes a plan to open the site to the public. In addition to the conservation work on mural paintings and the archaeological surveys to confirm the site's dimensions, we began research on the Buddhist caves in 2005.

In 2005 and 2006, we successfully conducted fundamental examinations aiming to understand and document the current situation of the caves and their architectural features for further management plans. They were executed along with the fifth and seventh missions of the Bamiyan Remains Preservation Business, within the framework of the 'Cooperative Project for Conservation and Restoration of the Cultural Property in West Asia', and funded by the consignment fund of NRICPT.

This monograph reports these field studies. It is hoped that the present work sheds some light on some parts of our management projects at the Bamiyan site and also advances further understanding of and support for Japanese conservation activities on international cultural properties.

Finally, we are most grateful to all the participants for their support and cooperation: Ministry of Information and Culture Islamic Republic of Afghanistan, UNESCO, Agency for Cultural Affairs of Japan, Ministry of Foreign Affairs of Japan, and other related agencies. Our special thanks go to Emeritus Professor of Kyoto University Yasutaka Higuchi from the Kyoto University Archaeological Mission in Central Asia, who has kindly granted us permission to reproduce the photos taken in the 1970s along with many essential figures. The names and titles of institutions and individuals are based on those of the time.

Wataru KAWANOBE
Director, Japan Center for International Cooperation in Conservation
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Chapter 1 Overview of the research on the Bamiyan Buddhist Caves

Bamiyan Buddhist Caves

The Bamiyan site is located about 120 km west-northwest of Kabul, the capital of Afghanistan. It is also situated at a height of about 2,500 m above sea level in the mountains on the west side of Hindu Kush that extend east and west across central Afghanistan (Fig. 1). After the disastrous demolition of the two Giant Buddhas in March 2001, the site was inscribed on the World Heritage List with the title 'Cultural Landscape and Archaeological Remains of the Bamiyan Valley' and the List of World Heritage in Danger in July 2003. The imperilled site contains the East and West Giant Buddhas along with the caves on the Bamiyan Great Cliff, the caves in the Kakrak and Foladi valleys, the sites in Shahr-i Zohak, Shahr-i Gholghola, Qal'a-i Kafari and their buffer zones, and the entire landscape encompassing all of these locations.

A series of hundreds of caves extended over roughly 1.3 km of the Bamiyan Great Cliff, on which the two Giant Buddhas had been carved before their destruction in 2001. Previous missions have numbered more than 750 caves, but there are still many caves unnumbered or untouched throughout the entire Bamiyan region. The Bamiyan Buddhist Caves would seem to be one of the most famous large-scale set of caves, comparable to the Mogao Caves in China (with more than 730 caves stretching for 1.7 km north and south); the Longmen Grottoes in China (with more than 2,300 caves stretching out over a 1 km area north and south); and the Kizil Caves in China (with 236 caves extending for 2 km).

The Bamiyan Buddhist Caves, a primary element of the Bamiyan site, feature a variety of influences from the architectural designs of several regions and cultures, including the Gupta Empire in India, Gandhara in the northwest of Pakistan, and Sassanian Persia in Iran and Central Asia. The Bamiyan Buddhist Caves contain features of both masonry construction and wooden structures, and additionally feature ceiling structures of traditional architectures that hardly remain today and are not generally found. This is highly important from the viewpoint of architectonics. The layout and architectural space of the caves are also crucial topics for the study of Buddhist architecture in the period when these caves were constructed.

Background to the research

Full-scale international conservation works for the Bamiyan site began in 2003. The first phase included, for the purposes of security, landmine removal, cliff reinforcement and disposal of debris from the fallen Giant Buddhas. As for the building structures in the Bamiyan Valley, RWTH Aachen University in Germany has been examining traditional architecture patterns since 2004 in order to develop a master plan.

It became possible to investigate the Buddhist caves from an architectonic viewpoint after landmine removal in front of the Bamiyan Great Cliff was partially completed in 2005, which allowed us safe access to the primary caves. While the Bamiyan Buddhist Caves have long been studied within the framework of art history and architectural history, as a characteristic element of the Bamiyan Buddhist site they have not been documented for conservation. These caves have been severely damaged by bedrock fall, weathering and the demolition of the Giant Buddhas during the civil war. In the East cave-niche in particular, the walls of caves at the foot of the cave-niche were blasted off and then partially collapsed. This also caused a huge crack at the back of the niche, which still poses severe problems.

Under the circumstances, NRICPT and NNRICP started documenting the Bamiyan Buddhist Caves, including their present condition, for the future management of the caves.

Outline of the research

Detailed investigations of the present condition of the Buddhist caves from the viewpoint of architectonics were executed twice, in 2005 and 2006, in order to facilitate the future conservation, management and utilisation of the site. In the first mission (10–15 November 2005), only visual examination was employed to understand a portion of the caves and their traditional architecture because we were not allowed to stay at the site for long periods. This first examination, however, provided the direction for future missions. During the second mission (18 September–10 October 2006), we were able to study the contemporary condition of the caves in greater detail.

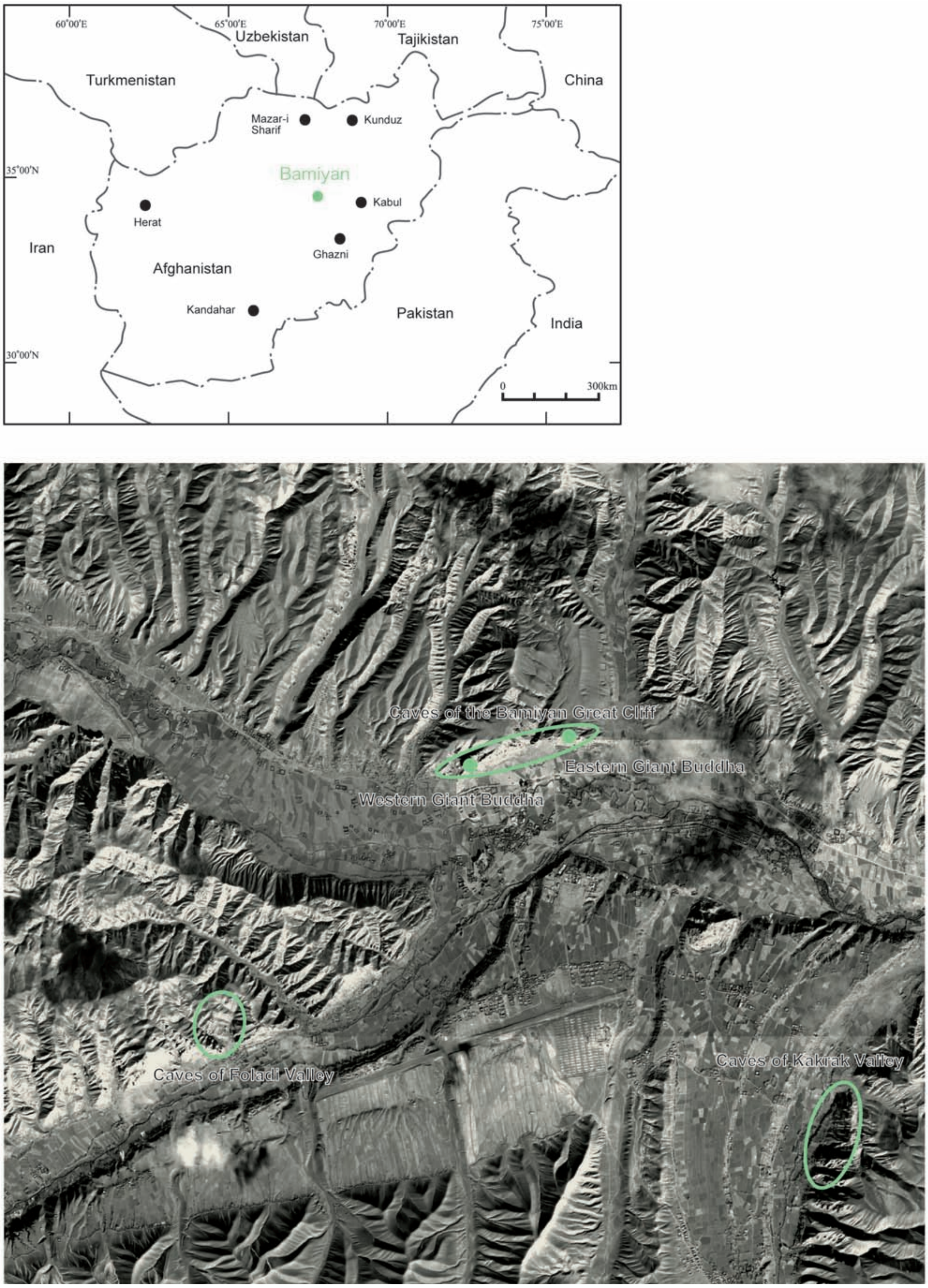


Figure 1 Location of the Bamiyan Buddhist Caves.

Paralleling the architectonically detailed research, the caves were also surveyed within the context of documenting the present condition of the caves. The first survey was conducted in July 2003 and focused on the cave-niche and its surrounding area, as part of a UNESCO commission for the PASCO Corporation. Since July 2005, access to many of the caves has been easier and we have been able to survey the caves containing mural paintings. In June 2007, NRICPT and NNRICP cooperated to measure 12 clusters of caves (28 caves in total) with significant architectural value. In total, 28 clusters of caves (68 caves) have already been surveyed.

Purpose and procedure

Purpose

The Bamiyan Buddhist Caves are clustered, such that the caves with the most crucial forms are central to the overall design. Caves with various centred plans are situated on several points of the Bamiyan Great Cliff, distinct from the area surrounding the famous East Giant Buddha. As the bedrock is fragile, the Bamiyan Buddhist Caves have become damaged at an accelerated pace. It is obvious that there is a huge difference between the present condition of the caves and the situation in the 1970s, when Kyoto University documented them photographically. There are now more caves that are inaccessible because of the effects of deterioration, such as Caves XII, P and R. Therefore it is necessary to immediately document the present condition of the most substantial caves for further academic survey and conservation of the site. In addition, the consequences of opening the site to the public must also be taken into account.

The priority concerns for further examination are as follows:

1. To understand the present condition and recognise the actual state of the caves and the most pressing conservation issues.
2. To investigate the main caves at great length and assess the site from the viewpoint and methodology of architectural history. It is believed that this process would produce an academic corpus.
3. To assess the site from the viewpoint of security. It is hoped that this will be of help for opening the site to the public and developing a management plan in the future.
4. To train personnel who are in charge of the cave management.

This mission examined the major caves in the Bamiyan Great Cliff and the Foladi and Kakrak valleys. In addition, some traditional architecture in the Bamiyan Valley was also studied in order to understand the local conventional architectural techniques.

Procedure

The followings tasks were completed in light of the previous studies. From the viewpoint of human resource development, for the preservation of local architectural heritage, all the projects at the site have been conducted by our Japanese team and the Afghan specialists.

Documentation of present condition

The present condition of the Buddhist caves on the Bamiyan Great Cliff was visually inspected and documented photographically. We created categories

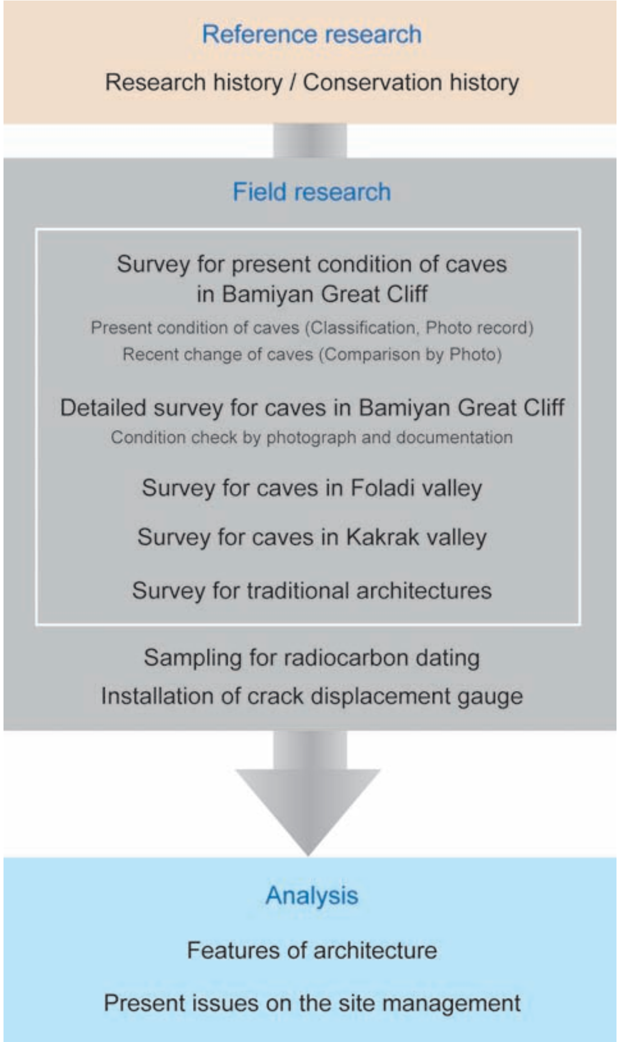

Reference research
Research history / Conservation history
Field research
Survey for present condition of caves in Bamiyan Great Cliff
Present condition of caves (Classification, Photo record)
Recent change of caves (Comparison by Photo)
Detailed survey for caves in Bamiyan Great Cliff
Condition check by photograph and documentation
Survey for caves in Foladi valley
Survey for caves in Kakrak valley
Survey for traditional architectures
Sampling for radiocarbon dating
Installation of crack displacement gauge
Analysis
Features of architecture
Present issues on the site management

Figure 2 Flow chart.

for classifying the caves based on the damage level: 'total collapse', 'major collapse', 'half collapse' and 'preserved'. These criteria were employed for all the available Buddhist caves on the Bamiyan Great Cliff. During the second mission, categorisation work was completed for the eastern caves (from Cave 396 eastwards).

As for photographic documentation, the cave photographs were taken from the same angles as those of Kyoto University (Higuchi 1984) in order to use the comparison to understand what has happened to the caves during recent years.

Detailed examination

Visual examination, photographic documentation and partial surveys were completed on those caves that are architectonically important in order to comprehend their actual status. Selected caves with the centred plan (square plan, circular plan and octagonal plan) were studied by visual inspection. The present condition, space compositions and functions, and structural and technical features of these caves were also investigated.

Based on the visual inspection, the layout, form and present condition (such as internal and external damage to the caves and its possible causes, position and shape of cracks, traces of changes, and previous restoration projects) were recorded (see Fig. 63). Walls, ceilings and floors were documented photographically using both panoramic and closely focused views. Surveys with measuring tape and a rangefinder were only completed on a limited number of caves due to time restrictions.

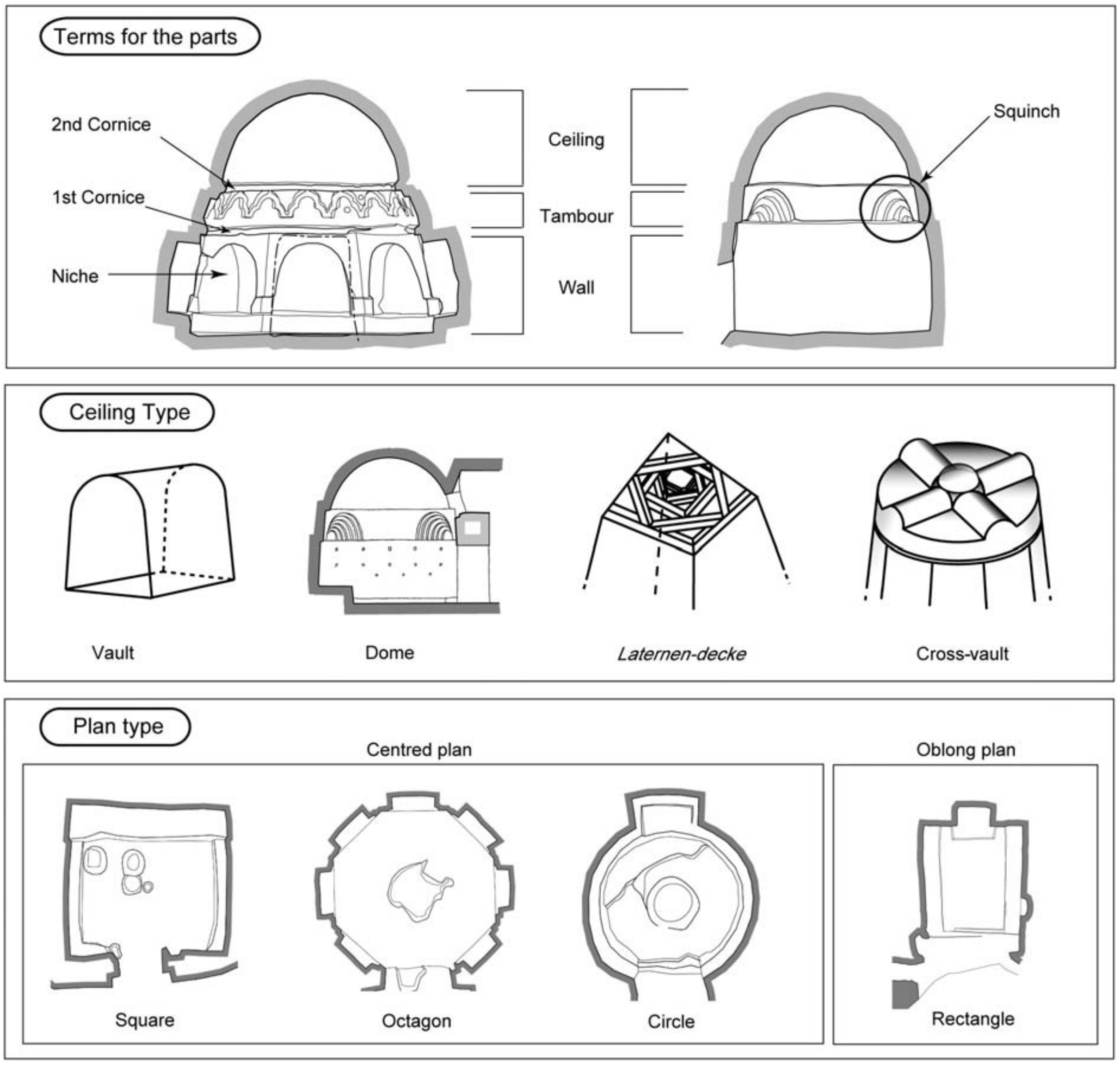


Figure 3 Terms used for each part, ceiling and plan types.

Caves in the Foladi Valley and the Kakrak Valley

The Bamiyan World Heritage site includes the caves in the Foladi Valley and the Kakrak Valley as well as those of the Bamiyan Great Cliff. For the purposes of future management planning, these caves must be considered comprehensively. Therefore, visual examination was carried out on the caves in the Foladi and Kakrak valleys in order to understand their present condition, despite the time constraints.

Traditional architecture

As for the traditional architecture, the present condition was inspected and architectural structures and conventional techniques were scrutinised. This is a preliminary study based on the assumption that until now the architectural structures and skill involved in cave construction belong in the realm of traditional architecture.

Samples for radiocarbon dating

Samples of wall soil and tempers were collected from the major caves for radiocarbon dating, which could be used to discuss chronological interpretations of architectural history and art history.

Crack displacement scale

Crack displacement scales were set up on several rifts. These rifts were selected from the many cracks inside the caves, which are architecturally important because the rifts will presumably lead to further displacement. It is necessary to check any displacement and its range, if any, for conservation activities and security purposes when the site is opened to the public in the future.

Terms for the form and section of the caves

As previous studies do not necessarily provide us with consistent terms for the cave form and each section of the caves, we have unified the terms for each section of the cave, ceiling form and plan (Fig. 3). In addition, the terms for the space in front of the caves, such as ‘front room’ and ‘forecourt’, were not used distinctly and consistently in earlier studies. In this research, ‘front room’ indicates an independent space that is situated in front of only one cave and enclosed by walls in every direction. The other term, ‘forecourt’, in our mission represents the space that is located in front of one or more caves, and fenced by walls in three directions with an opening in one side.

The cave numbers for the most part follow those of the Nagoya University researchers. The Kyoto University numbers are employed if the caves were not numbered by Nagoya University.

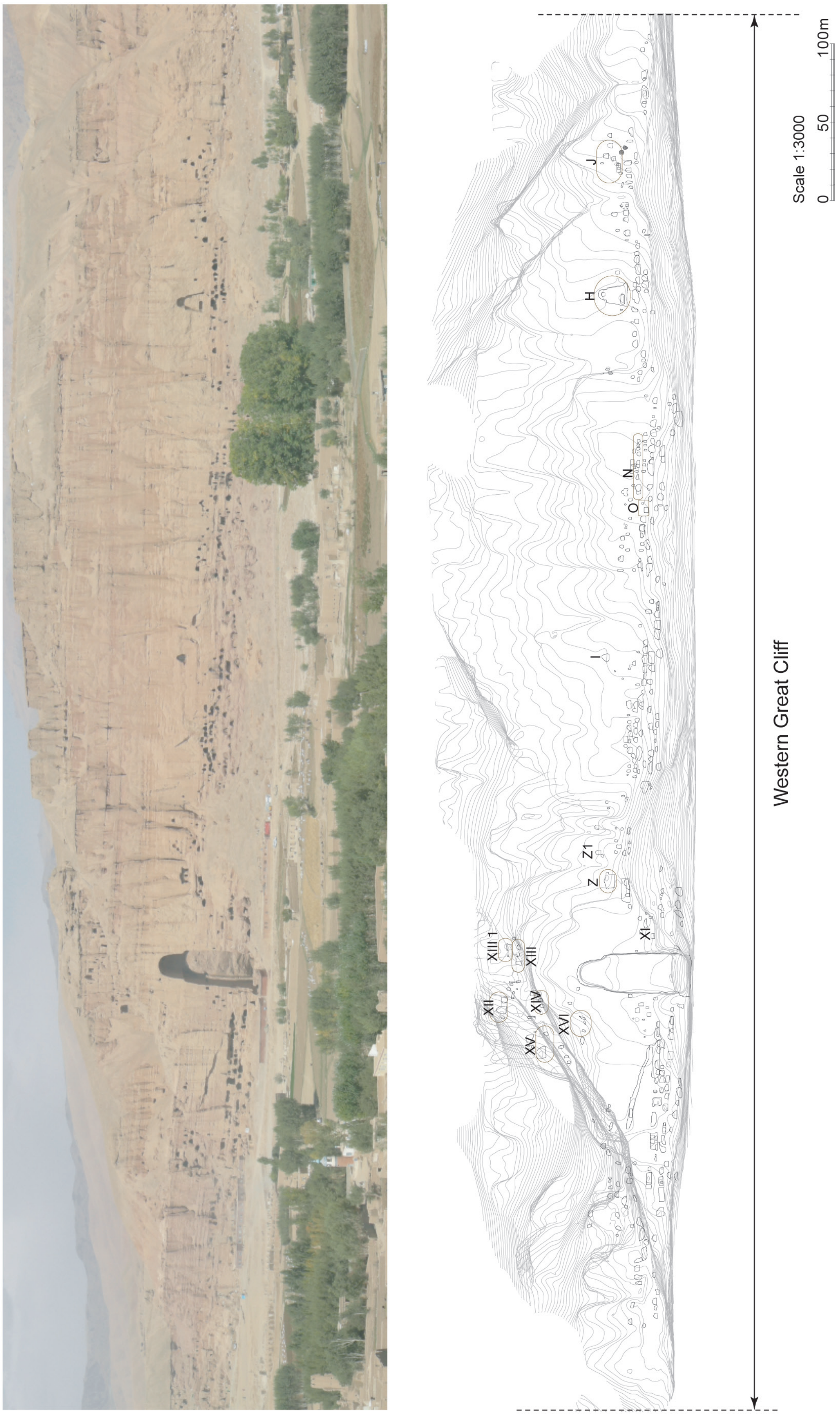


Figure 4 Elevation of the western cliff.

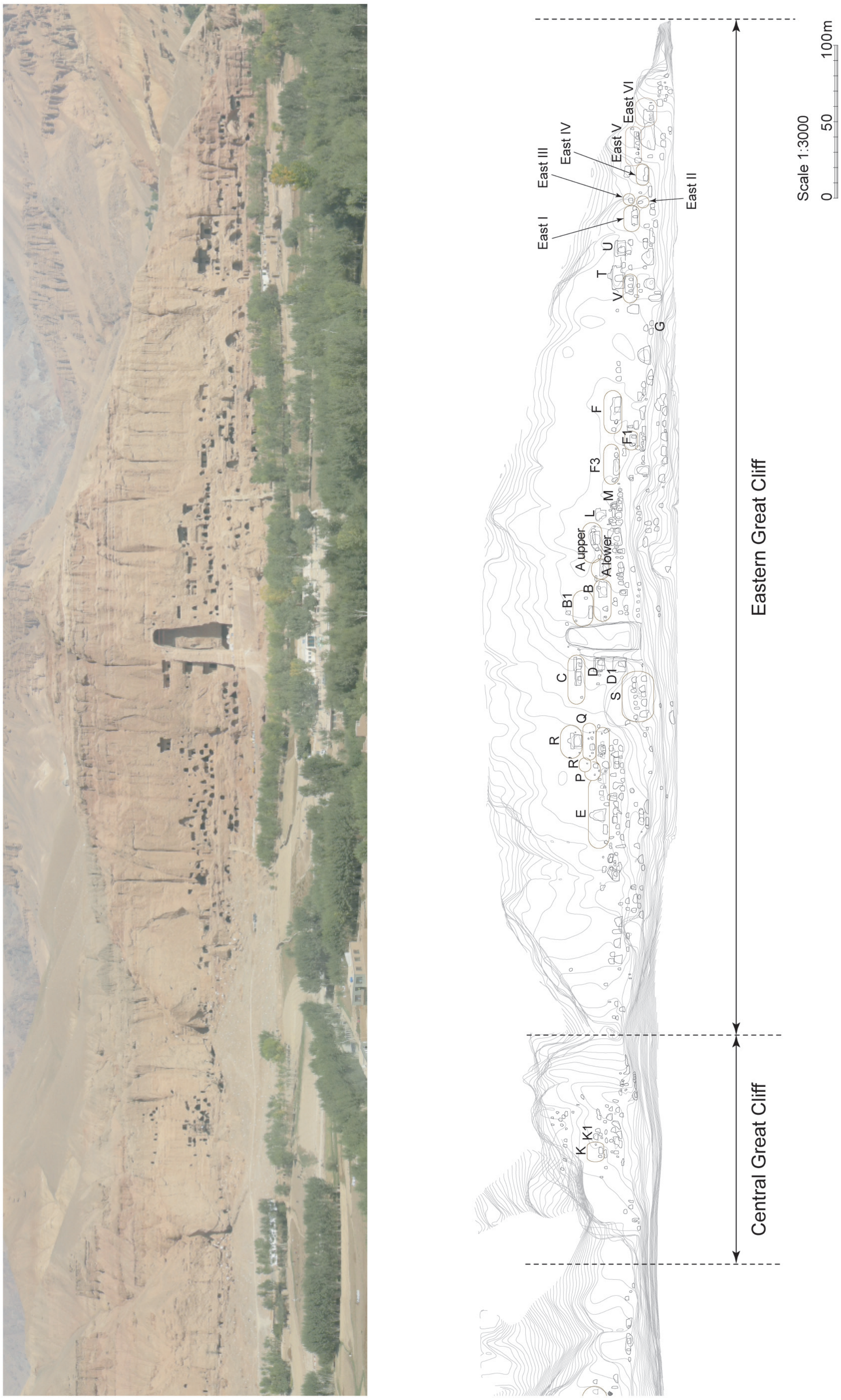


Figure 5 Elevation of the central and eastern cliff.

Chapter 2 Previous studies on the Bamiyan Buddhist Caves

Nineteenth century

The British survey first introduced the Bamiyan site to the public. Since then, there have been many discussions on the characteristics and functions of this site based on the Giant Buddhas, caves and the mural paintings within the caves. After the examinations by Moorcroft and Trebeck in 1824 (Moorcroft and Trebeck 1841), and Burnes in 1832 (Burnes 1833), Masson suggested by his investigation in 1835 that the Bamiyan site would have had a relationship with Mithraism and been influenced by Iran (Masson 1836). In addition to the publication of the English edition of *Da Tang Xi Yu Ji* by Beal in 1884, the discussion by Talbot *et al.* (1886) confirms that the Bamiyan site was a Buddhist site. As previous studies have researched the history of the whole Bamiyan site and the development of archaeological surveys and researches on the mural paintings (Maeda 2002; Miyaji 2002; Japan Center for International Cooperation in Conservation 2005), this chapter focuses instead on the architectonic features.

First half of the twentieth century

Délégation Archéologique Française en Afghanistan (DAFA)

The Délégation Archéologique Française en Afghanistan (DAFA) began a full-scale academic examination at the Bamiyan site in 1922 that lasted 30 years. The director, A. Foucher, concluded that the Bamiyan site flourished between the second and seventh centuries, based on his historical analysis of the site's importance (Foucher 1923). During the DAFA investigation, led by J. Hackin, the architect A. Godard and his colleagues photographed the caves and partially surveyed them, while Y. Godard traced the mural paintings. This mission's report was the first published architectonic investigation of the caves (Godard *et al.* 1928). The report defined some key terms for the main caves, several of which are still employed today.

This study covers both the East and West cave-niches and the caves surrounding the two Buddhas, Caves A, B, C and E. In the case of clustered caves, which consist of a series of caves connected by a front room or a corridor, our study assumes the function of each cave as possibly a sanctuary (sanctuaire), hall (reunion), vihara (cellule) or forecourt (vestibule). Furthermore, the resemblances to *laternen-decke* – often confirmed on the ceiling of the Bamiyan caves – are listed; one example is a traditional wooden structure from Central Asia.

On the basis of this research, Hackin, Carl and Baquette conducted a further investigation in 1930 and subsequently published their results (Hackin and Carl 1933). Their research contains more caves and survey maps, including examination of the caves in the Kakrak Valley. During this mission, Hackin named major caves A–K around the East Giant Buddha, and I–VII around the West Giant Buddha. He also employed these names for the clustered caves when necessary.

The caves surrounding the East Giant Buddha, which hold many mural paintings, are believed to be older than those around the West Giant Buddha, which employ more three-dimensional decorations. In addition, while the caves with a domed ceiling and *laternen-decke*, which seemingly reflect the structures on land, are assumed to have been done in an advanced style, the others are judged to be more rudimentary. Analysis of mural paintings and reliefs shows that Cave G is the oldest, dating from the third century, and that those surrounding the West Giant Buddha are the latest, dating from the sixth and seventh centuries.

Itsuji Yoshikawa

In 1939, a Japanese researcher, Itsuji Yoshikawa, investigated the Bamiyan caves together with Hackin and published the results (Yoshikawa 1948). He points out that the Bamiyan cave shrines were less influenced by the faith of stupa originating in India, and that the Giant Buddhas were more valued than the stupas. He also suggests that the tradition of building a colossus such as the two Giant Buddhas originated in Iran during the Hellenistic period.

Yoshikawa does not agree with Hackin about the functions of the caves. He assumes from the architectural

Table 1 Typology of the Bamiyan Buddhist Caves (after Kodera 1972: Table 1).

Plan type		Ceiling type	Features	Examples of caves
Centred plan	Square	Dome	Flatten structure remain in the corners	53-IV, 53-VI, 35-III
			Trapezoid form of corbels in the corners	137
			Squinch arches: supporting the dome structure	A Lower (a), B(a), 35-IV, V
			Squinch arches: curved on the dome structure	F1(a), G
			Particular type a	A Upper (c), B1(c), T
			Particular type b	U
		Laternen-decke	Imitation of flatten wooden structure	F3(f)
			Imitation of wooden structure of joists:	
			Walls without decoration	F(c), H, N
			Walls decorated with arcades and pilasters	53-V. XIII, XV, XVI
			Irregular type	S(f)
		Flat	Section form is almost rectangular	F3(a)
			Section form is trapezoid	E(h)
	Octagon	Dome	Without arcade	53-III, 35-VII
			With single tier arcade	F(a), D1
			With two-tier arcade	53-I, 53-II, XI
		Laternen-decke	Normal type	35I, A Upper (a), L, R(a)
			Exceptional type	O(a)
		Cross-vault	Normal type	35-II, D
	Circle	Dome		C, XII(d), 35-IV
Oblong plan	Rectangle	Flat	Section form is almost rectangular	XII(c), XIII(a), B1(a),
			Section form is trapezoid	XVI(a), E(k)
			Section form is trapezoid with steps	O(b), Q(b)
		Vaulted	Barrel vault	XIII(b), N(f)
			Barrel vault with steps	F3(c), East I(b)
		Other types	Cross-vaulted ceiling with a quarter line section	B(d)

perspective that there is no need to distinguish between 'sanctuaries' and 'halls', and that the 'halls' of Caves A, B and C could also be referred to as 'sanctuaries'. With regard to the caves' form, Yoshikawa believes – on the basis of a centred plan with point symmetry such as the octagonal or circular plans – that their form originated with the construction of memorial chapels in the Mediterranean world. He also concludes that the Bamiyan caves reveal a connection between the Western world and Central Asia, not India, based on the squinches in the ceiling structure, which indicate the influence of Sassanian Persia, and the *laternen-decke*, which derives from the Central Asian style.

Yoshikawa argues that the decorations in the later caves are more complicated than those of the earlier caves, improving the square plan. He also deduces that over time, the gouge technique was used less often. Furthermore, in contradiction to Hackin, who proposes that Cave G is the oldest Bamiyan cave, Yoshikawa presumes that Cave G, with its stupa, and Cave J must be the most recent on the basis of their designs. Recent radiocarbon dating indicates that Cave J is in a rather old group in Bamiyan (Yamauchi 2006a). Although there is a huge difference between design analyses and chronology, Yoshikawa's research is significant because he attempted to investigate a large portion of the Bamiyan caves within the framework of architectural history.

Second half of the twentieth century

Since 1952, teams from various countries, such as Japan, Italy and India, have begun examinations in Bamiyan, heralding a new era for the investigations and conservation works at the site. From Japan, Kyoto University began a research project in 1959 (Mizuno 1962), and Nagoya University started projects in 1964 and 1969 (Kodera *et al* 1971).

Kyoto University

After its original investigation in 1959, Kyoto University again examined the Bamiyan site in the 1970s (Higuchi

1984). During this mission, caves, including those in the Foladi Valley and the Kakrak Valley, were surveyed, documented photographically, and then given a new numbering system. The report was published in four volumes in 1984 and describes a very large number of caves, comparing their form with those of caves in other regions such as India. The report also discusses the chronology of the caves and contains very valuable photos.

Nagoya University

The published results of the Nagoya University mission contain highly informative survey maps of the primary caves (Kodera *et al.* 1971). The architectonic features of the caves were detailed by Takehisa Kodera, who was in charge of studying the structures of the caves (Kodera 1972). Kodera reconsiders the layout of each chamber from the viewpoint of function and change in worship style. He also presumes that the style of each cave's main chamber could be different in each district (for instance, around the West Giant Buddha, between the East and West Buddhas, around the East Giant Buddha, and in the section east of Cave F) and that these variations could indicate a chronological order.

He also divides caves into categories (Table 1) based on their plan and ceiling style, with further analyses for each cave. He studies the squinch and *laternen-decke* structures and proposes that designs seemingly without function could indicate a process through which people recognised these decorations as iconographical representations. He deals not only with caves with the centred plan but also caves with the oblong plan and façade, as well as the decorations. He then attempts to sort them chronologically on the basis of their architectonic characteristics.

In the latter half of his article, he explores the general meaning of the caves by analysing how their form differed from architectural forms on land and how the designs could have been transmitted. He concludes that the development of the caves was intended to create a symbolic space, and that the caves contain variety in their construction in order to better represent the ideal microcosm. He then returns to the Bamiyan caves, which contain a variety of patterns, and argues that the centred plan was significant because it emphasised the importance of humans in that space. This is an architectural analysis that endeavours to situate the Bamiyan caves in the history of cave shrine studies through the use of concrete evidence.

Archaeological Survey of India (ASI)

From 1969 to 1977, the Archaeological Survey of India (ASI), led by Sengupta, executed conservation works for both the East and West Giant Buddhas and their cave-niches, the surrounding caves, stairways and mural paintings under the auspices of UNESCO (Sengupta 1975). These were extensive projects. Drainage channels were required for the cliffs on which the cave-niches were located. As the side walls of the cave-niches contained many dangerous cracks, a buttress was in need of reinforcement for greater support. Also, it was necessary to restore the stairways inside the bedrock near the niche. Without these works, the damage inflicted by the demolition of the East and West Buddhas in 2001 would have been much more severe.

Zemaryalai Tarzi

In the 1970s, Zemaryalai Tarzi, the director of the Institute of Archaeology Afghanistan since 1965, completed his thesis on the excavation works at Bamiyan and submitted it to Strasbourg University, France, for completion of his degree (Tarzi 1977). The published version of the thesis added plans of the primary caves, reliefs and sketches of the statues.

The Soviet war in Afghanistan to the present

The Soviet invasion in 1979 and the subsequent decade-long civil war caused a great deal of turmoil in Afghanistan. This has significantly influenced the conservation of cultural properties in the country.

After the destruction of the two Giant Buddhas by the Taliban regime in 2001, the international community again cooperated to conserve and restore the Bamiyan site. It was inscribed on the World Heritage List with the title 'Cultural Landscape and Archaeological Remains of the Bamiyan Valley' and the List of World Heritage in Danger in 2003. This site is appreciated not only for the Great Cliff of the Giant Buddhas but also the archaeological remains in the valley in front of the cliff and the surrounding cultural landscape.

Under the auspices of UNESCO, the Independent Administrative Institution National Research Institute for Cultural Properties (as it was then called) took part in the examination of the Bamiyan site for conservation purposes. These international activities and the new scheme for site maintenance are detailed in the report published in 2005 (Japan Center for International Cooperation in Conservation 2005).

As for building structures, RWTH Aachen University in Germany has investigated traditional architecture in the Bamiyan Valley in order to create a master plan for the conservation, maintenance and use of the site. The investigation's results were compiled and published as a database in 2005 (Aachen University 2005). With regard to the caves, the German team has been sorting out fragments from the Buddhist statues left in the cave-niche. In addition, landmine removal was partially completed in autumn 2005, which made it possible to research the interiors of many of the caves.

Chapter 3 Present condition of the caves on the Bamiyan Great Cliff

Introduction

At the Bamiyan site, some conservation activities have been carried out since 2003, however these were not designed for the maintenance of the caves. The caves have weathered or suffered damage to varying degrees, therefore it is necessary to first understand their condition precisely in order to preserve them. We therefore focused on understanding the present condition of the caves on the Bamiyan Great Cliff, including the front spaces of the caves and the corridors, in addition to the actual caves. First, we classified the caves according to their present condition and documented their elevations with analyses. Then we compared them with the previous forms recorded in the photos taken by Kyoto University in the 1970s in order to identify recent changes in the caves and their environment.

Present condition of the caves

Method

The caves were categorised based on their level of damage. Each cave, or caves, was detailed in elevation and recorded photographically. This method was employed on all visible caves. These tasks were completed in 2006 with respect to the eastern caves (from Cave 396 eastwards) (Fig. 8).

The caves were classified according to four damage levels, from the most severe to the least: 'total collapse', 'major collapse', 'half collapse', and 'preserved'. Those caves that are not visible are documented as 'unidentified'. The criteria for judgement are as follows:

Total collapse: Only a trace of the cave is confirmed. Almost the whole structure is disrupted. Some parts of the walls and floor remain. It is highly possible the trace itself will be lost in the near future.

Major collapse: Form and layout of the cave can be recognised partially. Most parts of walls and ceiling are destroyed. It is difficult to confirm the whole image and its depth. These caves are not suitable for architectonic investigation and interpretation.

Half collapse: Form and layout of the cave can be confirmed. Some parts of walls and ceiling and the entrance and access are damaged.

Preserved: Although weathering and deterioration are noticed, the cave itself remains.

Unidentified: It is impossible to identify the cave because it is situated on a steep slope or destruction has limited access.

We have two elevation plans of the Bamiyan Great Cliff, one of which was created from the photographic survey carried out by Kyoto University in the 1980s. The other was produced by the PASCO Corporation with a 3D laser scanner in 2003. We employ the latter.

Results

The outcome of this investigation is shown in Figure 8 (elevation) and Table 2 (categorisation of caves).This evidence allows us to draw the following conclusions. The caves located in the lower part of the cliff remain in poor condition, except for those at the foot of the cave-niche of the East Giant Buddha, which was destroyed by the demolition. Many of the caves in poor condition are categorised as either 'major collapse' or 'half collapse'. In particular, some forecourts and corridors situated in the front of the upper part of the cliff remain (East Caves V, East Caves I, Cave T, Cave U, Caves A–Cave D1, Caves R, Caves E(l)–E(m), Caves K and a corridor in the forecourt of Caves J); however, none of the forecourts and corridors in the lower part remain. In addition, most of the stairways in the upper part are also disrupted.

The present condition also depends on the elevation at which the caves were constructed; this is probably caused by natural circumstances such as weathering and the collapse of the bedrock. It is also assumed that they have been considerably affected by human activities. For example, the caves in the lower part of the cliff have been used frequently for human habitation since the Buddhist Era and this has caused some changes in the caves, including the attrition of access corridors and stairways.

The present condition of neighbouring caves is similar in many cases. For instance, the area around Caves 53 and

54 was higher on the cliff than Cave T and Cave F (Fig. 6), and Caves 281–289 to the west of Cave E (Fig. 7) are categorised as either 'total collapse' or 'major collapse'. Presumably, based on the sheer cliff and debris in front of it, the cliff on which these caves were constructed suffered significant erosion. It can be said that the present condition of the caves depends on the bedrock situation of the cliff. Consequently, it is necessary to observe the circumstances around the caves and take into account the cliff condition for the conservation of the caves and the security of visitors.

Recent changes in the caves

The photos taken by the previous missions are very useful for understanding changes in the condition of the caves. Of the photographic data that exist of the many caves in Bamiyan, the 1984 report published by Kyoto University is the most fruitful and comprehensive (Higuchi 1984). Many of these photos were taken in the 1970s and can be compared with those from our mission in order to identify the changes that have occurred around and inside the caves during these decades.

Method

First, we chose some photos from the Kyoto University archives that illustrated the surroundings and interiors of the caves and provided a clear basis for comparison. Then, during our 2006 mission, we photographed the caves using the same angles as the selected photos (Figs 9–62).

As there are some trace indications of fallen bedrock around the caves, we focused on weathering and cracks on the cliff surface around the caves for the purposes of future conservation. The relevant photos from Kyoto University were, in most cases, taken from the southern part of the cliff, particularly the cave fronts. The visibility of the erosion and undulation on the cliff surface, as well as the outlines of the entrances to the caves, depends on lighting conditions, the season and time of day. Furthermore, there are some walls around the entrances that were built when the caves were used as human residences. We therefore paid careful attention to the outlines of the caves and the cracks on the cliff. A summary follows of the differences confirmed by comparison of the photos of the cave interiors and exteriors.

Results

Changes around the caves

The comparison of photos of the caves on the cliff shows the following changes around the caves (Figs 9–38). With regard to changes caused by natural factors, weathering and collapse of the siltstone on the cliff are confirmed (Figs 11, 17, 26, 28, 30, 35 etc.). In addition, it is also verified that cracks on the cliff have expanded and the erosion has progressed (Figs 25, 29, 32, 47 etc.).

The collapse and destruction of the cliff surface and caves around the cave-niches were caused by human activity, particularly the serious alteration as a result of the demolition of both the East and West Giant Buddhas during the civil war (Figs 19, 34 etc.). The following changes have also been documented: the construction of pathways and walls, alterations to the caves made when converting them to residences, and the ablation of the pathways to the caves (Figs 16, 25, 26, 27, 37 etc.).

Some of the caves have been noticeably ruined around their entrances, windows and upper surfaces (Figs 11, 12,

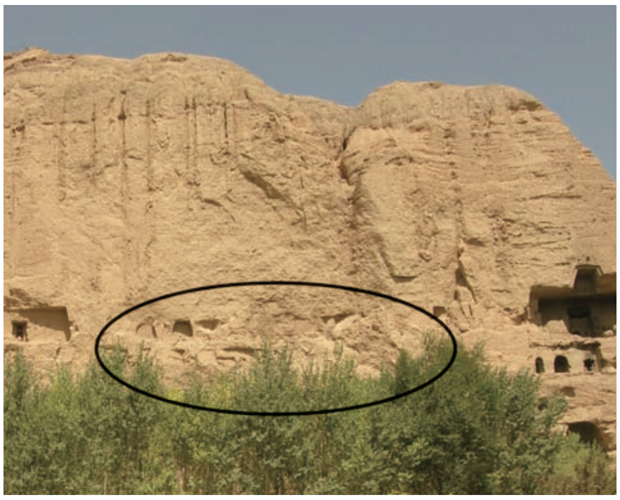


Figure 6 Caves 53 and 54.

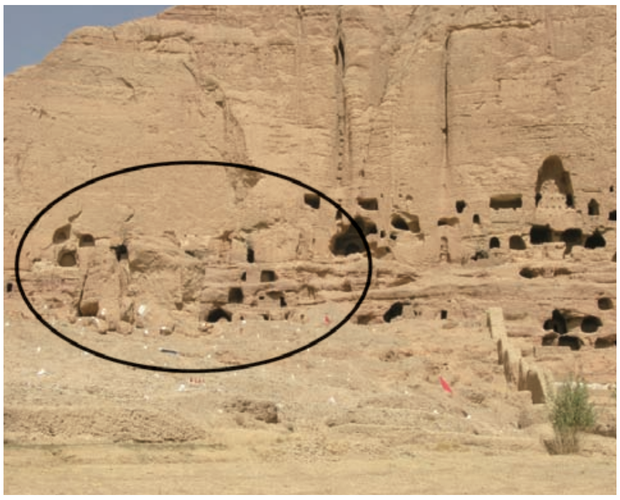


Figure 7 Caves 281–289.

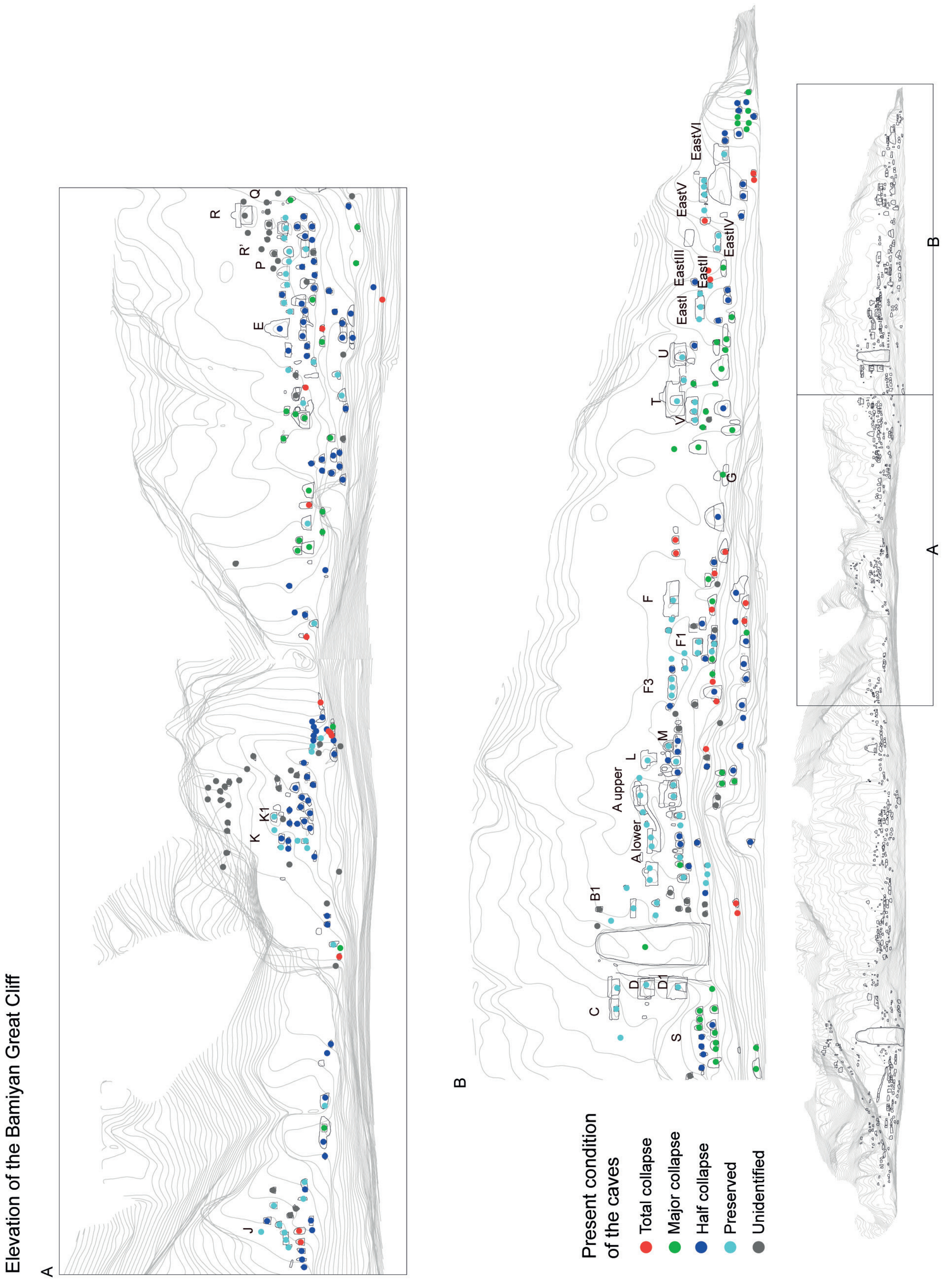


Figure 8 Classification.

Table 2 [copy to follow]

Cave no.		
Nagoya Univ.	Kyoto Univ.	Damage level
	1	Major collapse
	2	Half collapse
	3	Half collapse
	4	Major collapse
	5	Half collapse
	6	Half collapse
	7	Half collapse
East VI (e)	8	Half collapse
East VI (c, d)	9	Half collapse
East VI (a, b)	10	Preserved
East V (c)	11	Preserved
East V (a)	12	Preserved
East V (d)	13	Preserved
East V (e)	14	Preserved
East V (b)	15	Total collapse
East IV (b)	16	Preserved
East IV (a)	17	Preserved
	18	Major collapse
	19	Half collapse
	20	Half collapse
	21	Half collapse
	22	Total collapse
	23	Total collapse
East III	24	Half collapse
East II	25	Preserved
East I (c)	26	Preserved
East I (a)	27	Preserved
East I (b)	28	Preserved
	29	Half collapse
	30	Half collapse
	31	Major collapse
	32	Half collapse
U	33	Preserved
T	34	Preserved
T	35	Preserved
	36	Half collapse
	81	Preserved
	82	Preserved
	83	Major collapse
	84	Major collapse
F4	85	Half collapse
	86	Preserved
	87	Preserved
F3 (e)	88	Preserved
F3 (d)	89	Half collapse
F3 (c)	90	Preserved
F3 (a)	91	Preserved
F3 (f)	92	Preserved
F3 (g)	93	Half collapse
	94	Total collapse
	95	Half collapse
	96	Total collapse
	97	Unidentified
	98	Half collapse
	99	Total collapse
	100	Half collapse
	101	Total collapse
	102	Major collapse
	103	Half collapse
	104	Half collapse
	105	Half collapse
	106	Half collapse
	107	Half collapse
	108	Unidentified
	109	Unidentified
	110	Unidentified
M	111	Preserved
	112	Half collapse
	113	Half collapse
L	114	Preserved
	115 (118)	See 118
	116	Half collapse
B1 (c)	150	Preserved
B1 (a, b)	151	Preserved
B1 (d)	152	Preserved
	153	Unidentified
	154	Unidentified
East cave-niche	155	Major collapse
35-IV	156	Preserved
	157	Half collapse
35-III	158	Preserved
35-II	159	Half collapse
35-I	160	Half collapse
35-V	161	Half collapse
35-VI	162	Preserved
35-VII	163	Preserved
C (b)	164	Preserved
C (a)	165	Preserved
C (c, d)	166	Preserved
D	167	Preserved
D1	168	Preserved
	169	Major collapse
S (g)	170	Major collapse
S (f)	171	Major collapse
S (e)	172	Major collapse
S (d)	173	Half collapse
S (c)	174	Half collapse
S (b)	175	Half collapse
S (a)	176	Half collapse
	177	Unidentified
S (m)	178	Major collapse
S (l)	179	Half collapse
S (k)	180	Major collapse
S (i, j)	181	Major collapse
S (h)	182	Major collapse
	183	Unidentified
	184	Total collapse
	185	Unidentified

Table 2 [copy to follow] *cont'd*

Cave no.		
	37	Major collapse
V (d)	38	Preserved
V (a)	39	Preserved
V (c)	40	Preserved
V (b)		Major collapse
	41	Major collapse
	42	Major collapse
	43	Major collapse
	44	Major collapse
	45	Major collapse
	46	Major collapse
	47	Major collapse
	48	Half collapse
	49	Unidentified
	50	Major collapse
G	51	Major collapse
	52	Half collapse
	53	Total collapse
	54	Total collapse
	55	Half collapse
	56	Total collapse
	57	Total collapse
	58	Major collapse
	59	Unidentified
F (a)	70	Preserved
F (b)	71	Preserved
F (c)	72	Preserved
	73	Unidentified
	74	Half collapse
	75	Major collapse
	76	Total collapse
	77	Unidentified
F1 (a)	78	Preserved
F1 (b)	79	Preserved
	80	Half collapse
	117	Half collapse
	118	Preserved
A Upper (c)	119	Preserved
A Upper (a, b)	120	Preserved
A Upper (d)	121	Preserved
A Upper (e)	122	Preserved
	123	Preserved
	124	Preserved
	125	Preserved
	126	Unidentified
	127	Unidentified
	128	Preserved
A Lower (a)	129	Preserved
A Lower (b)	130	Preserved
	131	Half collapse
	132	Half collapse
	133	Half collapse
	134	Preserved
	135	Major collapse
	136	Half collapse
	137	Preserved
B (a, b)	138	Preserved
B (c)	139	Preserved
B (d, e)	140	Preserved
B (f)	141	Preserved
	142	Preserved
	142 East 1	Preserved
	142 East 2	Preserved
	143	Half collapse
	144	Unidentified
	145	Unidentified
	146	Unidentified
	147	Unidentified
	148	Unidentified
	149	Unidentified
	186	Half collapse
	187	Major collapse
	188	Major collapse
	189	Unidentified
	190	Half collapse
	191	Half collapse
	192	Major collapse
	193	Half collapse
	196	Total collapse
	197	Total collapse
	198	Major collapse
	199	Major collapse
R (d, e)	200	Unidentified
R (a)		Unidentified
R (b)	201	Unidentified
R (c)	202	Unidentified
Q (c)	203	Unidentified
Q (b)	204	Unidentified
Q (a)	205	Unidentified
Q (f)	206	Unidentified
Q (e)	207	Unidentified
Q (d)		Unidentified
R' (a)	208	Unidentified
R' (b)		Unidentified
P (a, b)	209	Unidentified
P (c)	210	Unidentified
P (d)	211	Unidentified
	212	Major collapse
E (n)	213	Preserved
E (m)	214	Preserved
E (l)	215	Preserved
E (k)	216	Preserved
E (j)	217	Preserved
E (i)	218	Preserved
E (h)	219	Preserved

16, 33, 36 etc.). It is assumed that this destruction was created partially by excavation of the rock itself, as well as other natural and human-based factors. Most significantly, excavation would have caused the rock to cave in due to the tensile effect generated by the redistribution of stress because of the weakness of the bedrock. It would therefore be conceivable that the composite factors causing the devastation to the cave entrance area were neither natural nor caused by human activity.

Changes inside the caves

Figures 39–62 illustrate the many changes inside the caves created by natural factors in addition to artificial reasons. The most severe and significant proportion of the damage caused by humans was the demolition during the civil war, which has affected not only the caves at the foot of the East Giant Buddha that were destroyed by the explosion (Fig. 47), but also Cave D to the west of the East Giant Buddha, on the east wall of which a new crack has been confirmed (Fig. 50). It is presumed that the caves around both the East and West cave-niches were affected by the explosion, including many non-visible cracks in addition to the crack discovered in Cave D during the photo comparison. It should be noted that bullet marks, shoe prints and graffiti inside Cave A Upper (c) have been confirmed, which is a major change (Fig. 42).

Many caves have lost the clay covering on their wall surfaces and ceilings, along with the three-dimensional decorations. The evidence indicates that arabesque decorations in Caves U, D and XI installed on the faces of cornices and rims of niches have been ripped off (Figs 40, 50, 56). It is believed that the mural paintings in Caves A Lower (a), E(e), and Z1 were detached recently based on the fact that the original bedrock has little dust. The paintings up to the ceiling were looted, indicating a well-planned robbery (Figs 44, 45, 46, 54, 61). The photo comparison shows that the damage inside the caves was caused mainly by human actions.

Summary

Table 3 demonstrates the most significant recent changes to the cave interiors and exteriors discovered by comparison of the photos. The cliff surface and the outside caves partially indicate changes wrought by both nature and human activity. Although the changes on the cliff cannot currently be considered major, their future status is unpredictable because of possible further weathering of the Bamiyan Great Cliff. When the cliff is exposed beyond its limit, significant alterations to the cliff will occur.

The cave interiors exhibit noticeable changes caused by human activity. The cave at the foot of the East Giant Buddha has suffered severe damage as a result of the blast, including major changes to the structure of the cave. It is obvious that many valuable materials, such as three-dimensional decorations and mural paintings, have been lost over the last few decades. This directly affects the historical and academic value of the Bamiyan Buddhist Caves.

Our photo comparison proves that accumulation of image materials for comparison is crucial as basic data for future site management. Unfortunately, photos taken by the Kyoto University mission do not focus on the areas in which some cracks and damages on the wall clay and structure itself were found in 2005. Thus, it is difficult to determine when they were created. It is necessary to take photos and record images in order to document the current situation and continue to make regular observations for future site management.

Table 3 [copy to follow]

Factor of change	Situation	Place
Natural factor	Weathering and collapse of the surface on the cliff, especially siltstone	East Cave VI(a), Cave 5, around Caves L–B, around Caves S, around Caves E, around Caves 482–492, around Caves 492–501, around Caves N, around Cave I, around Caves XII, around Caves XIII, middle of the cliff from the western edge to the top etc.
	Crack expansion on the cliff	Around Caves 482–492, around Caves N, around Caves Z, around Cave I, around Caves XII, around Caves XIII etc.
Composite factor	Collapse and ruin of opening space of the caves and their upper cliff surface	East Cave VI(a), Cave U, Caves F1, around East Giant Buddha, around Caves E–R, around Cave I, around Cave XI, around Caves XIII etc.
Human-caused factor	Influence of the civil war (collapses caused by explosion, damages, cracks, bullet marks)	Around east cave-niche, around west cave-niche, Cave D, Caves E, Cave V, Cave T etc.
	Change by inhabitancy, ablation of the pathways	Around Caves F1, Cave E(e), around Caves J, around Cave H, around Caves 482–501, around Caves below Cave I, around Caves Z, around Cave Z1, around Caves 638–665 etc.

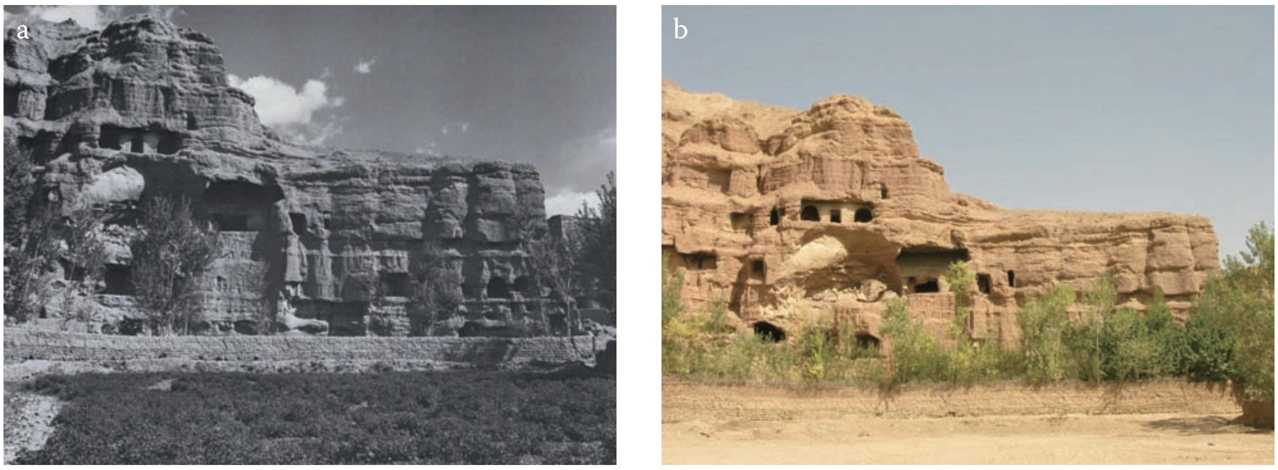


Figure 9 (a) Eastern edge in 1970 and (b) in 2006 (after Higuchi 1984).

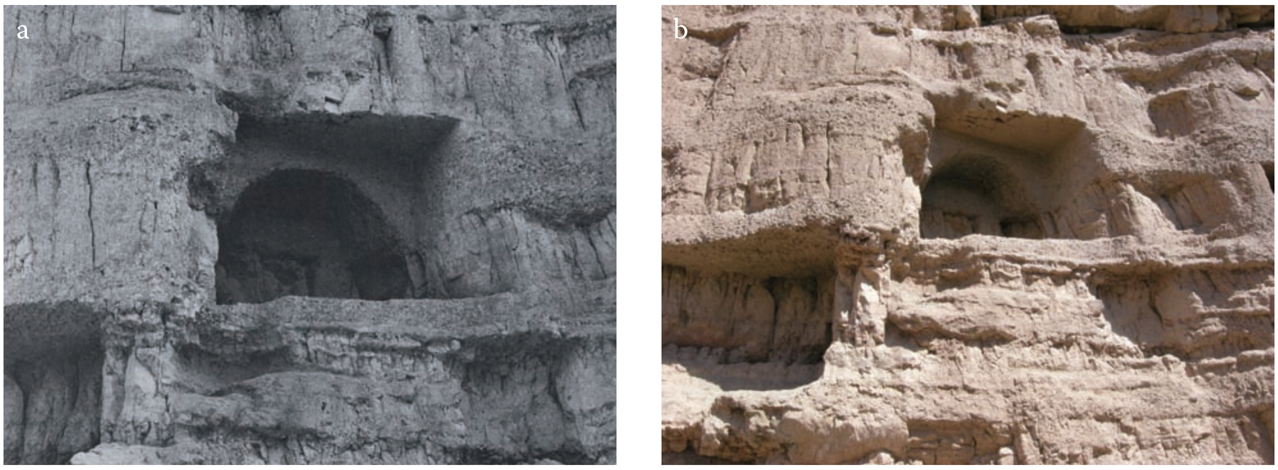


Figure 10 (a) Cave 5 in 1970 and (b) in 2006 (after Higuchi 1984).

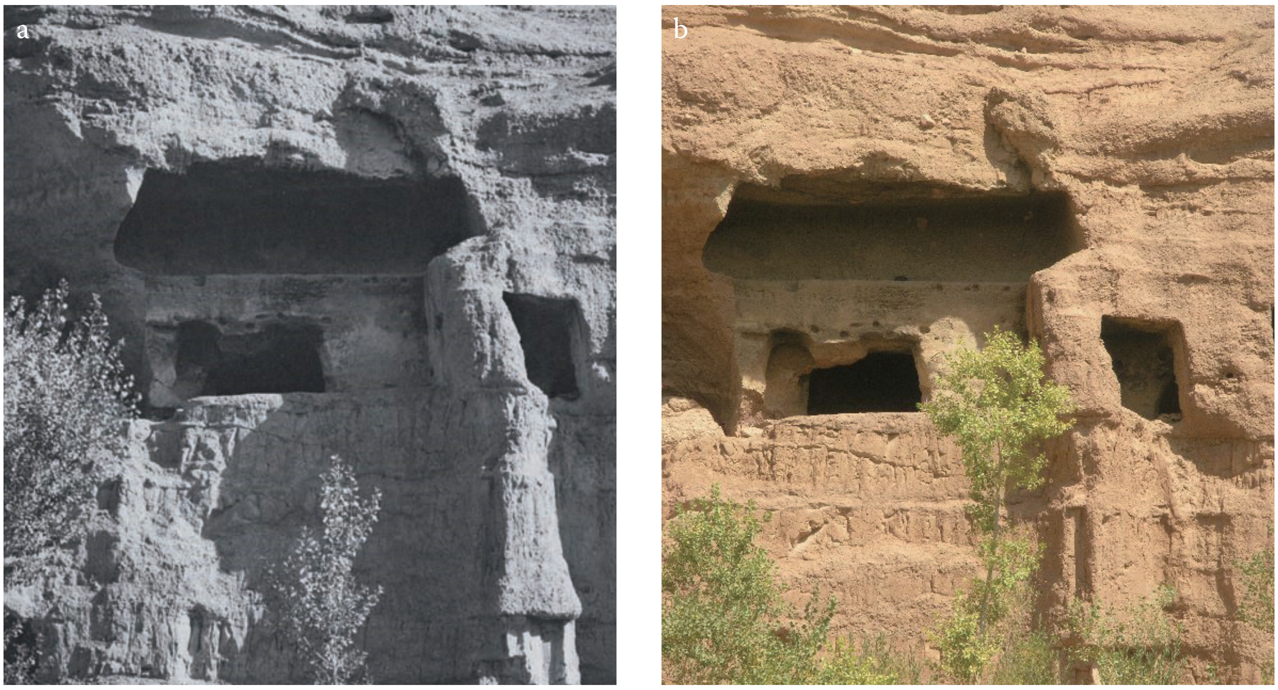


Figure 11 (a) Cave VI in 1970 and (b) in 2006 (after Higuchi 1984).

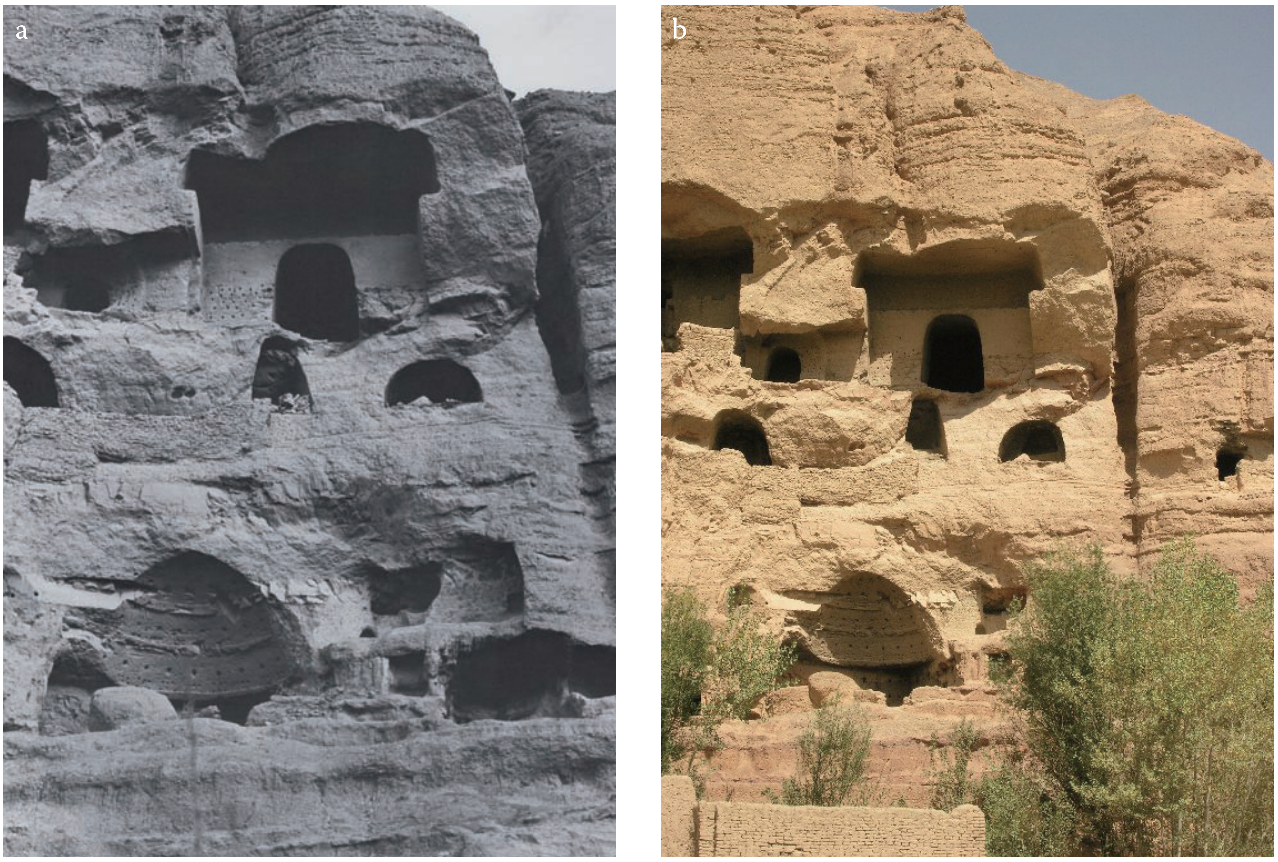


Figure 12 (a) Cave U in 1970 and (b) in 2006 (after Higuchi 1984).

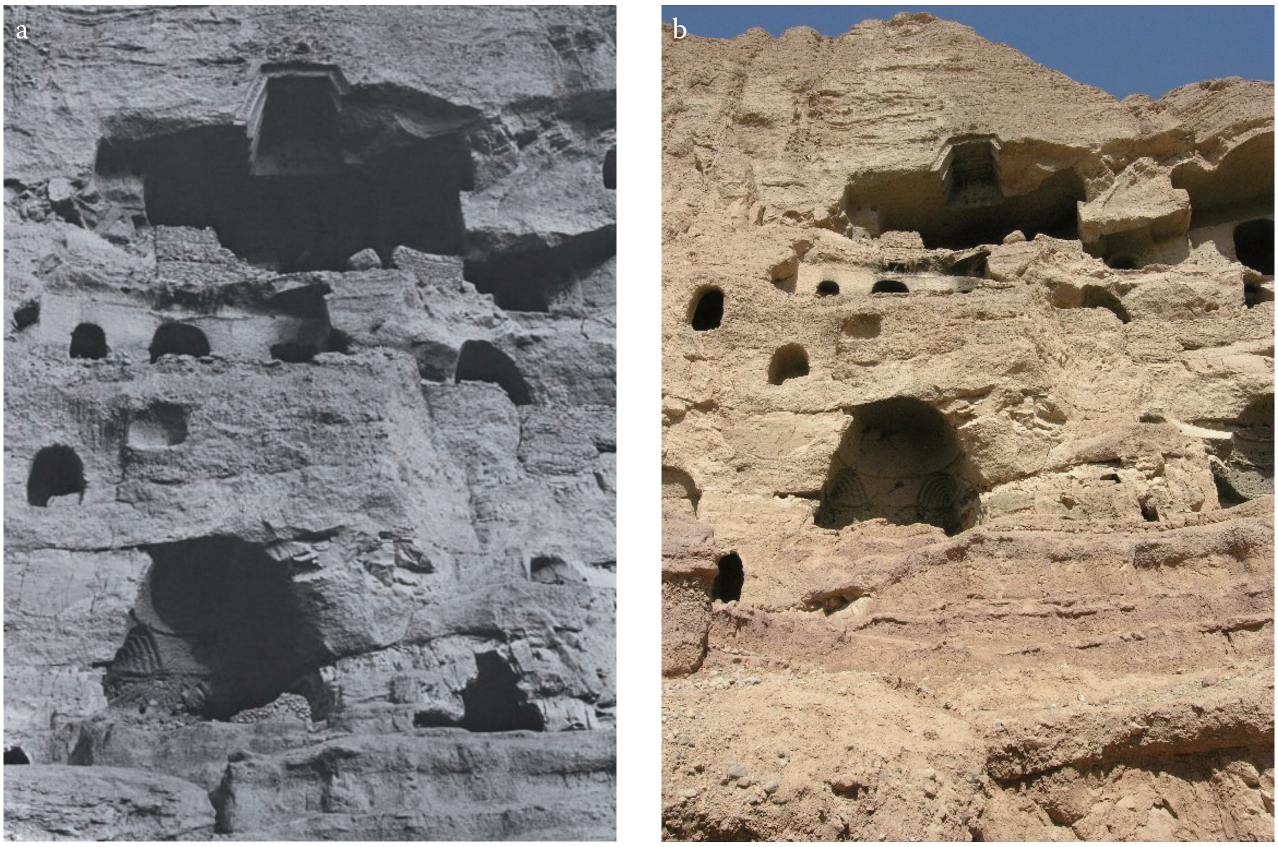


Figure 13 (a) Cave T in 1970 and (b) in 2006 (after Higuchi 1984).

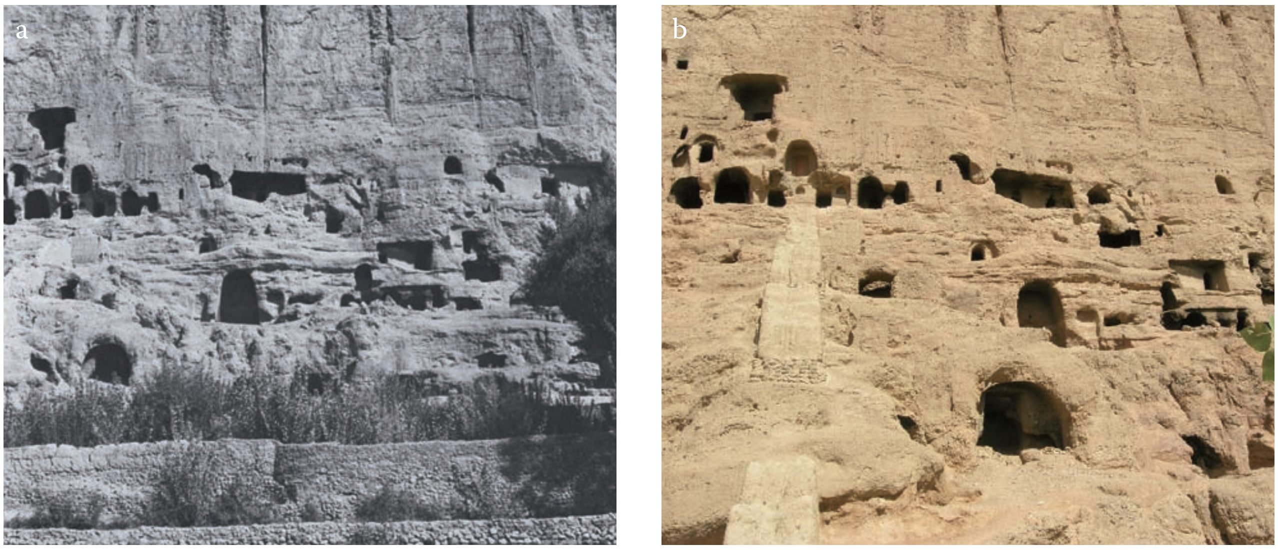


Figure 14 (a) Cave F(a) in 1970 and (b) in 2006 (after Higuchi 1984).

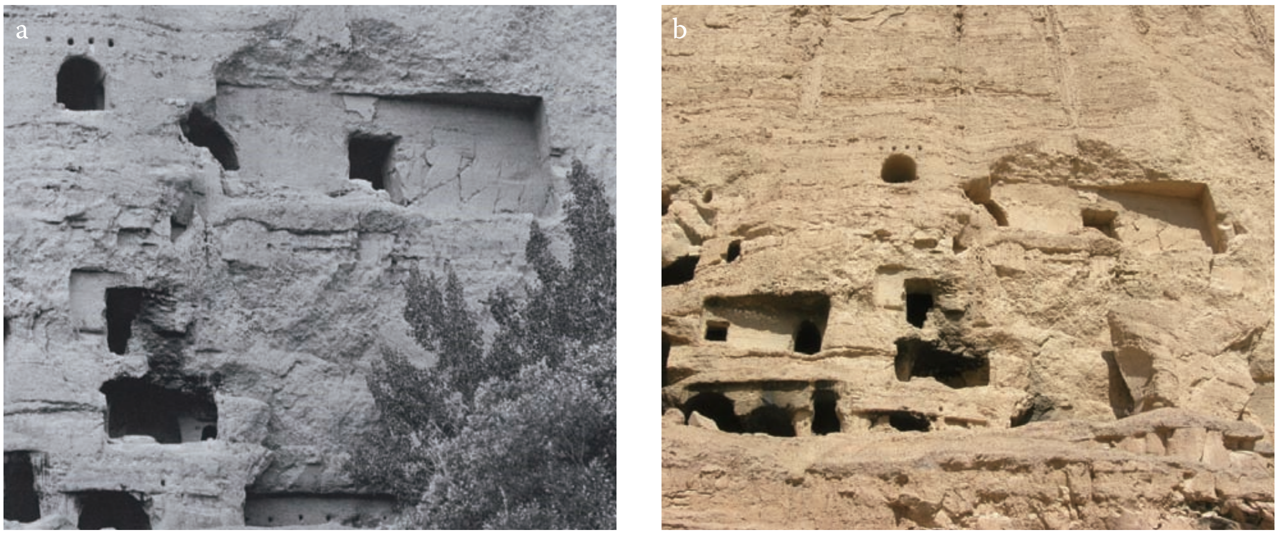


Figure 15 (a) Cave F in 1970 and (b) in 2006 (after Higuchi 1984).

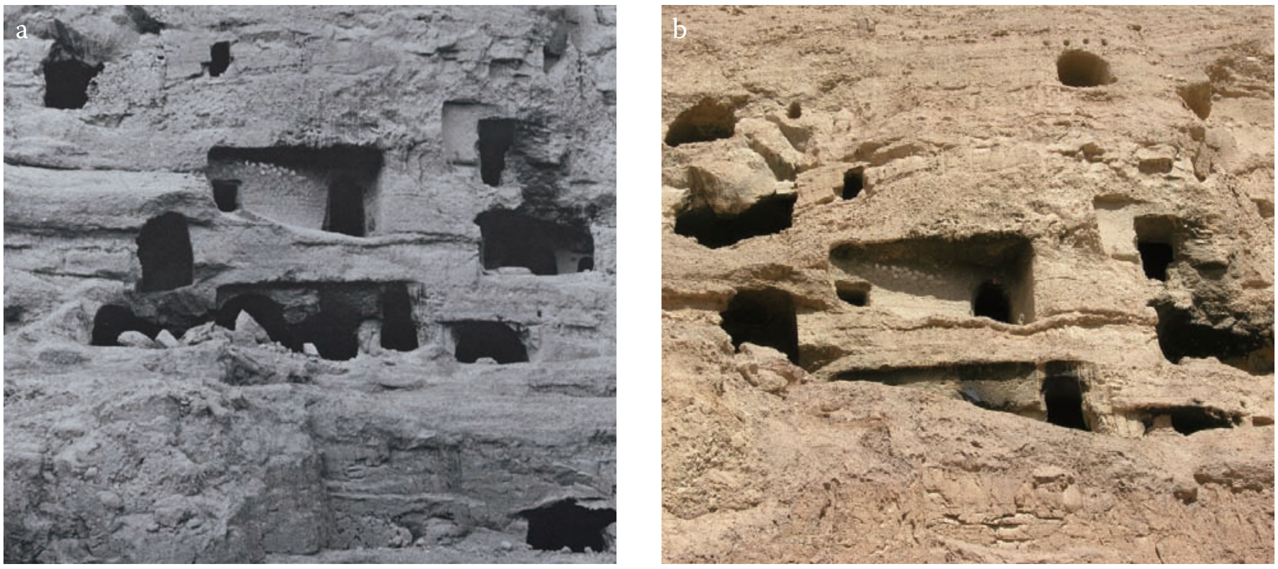


Figure 16 (a) Cave F1 in 1970 and (b) in 2006 (after Higuchi 1984).

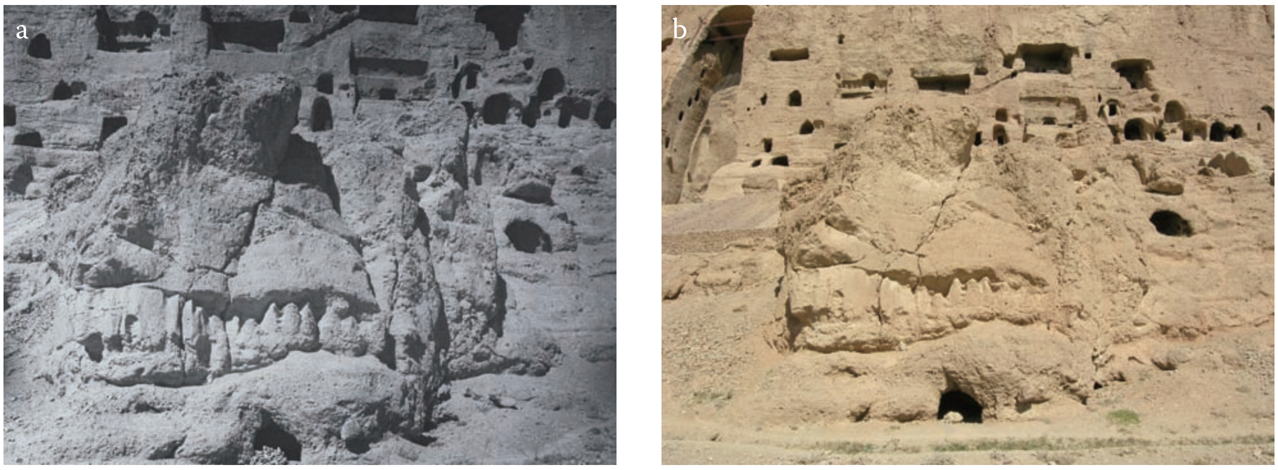


Figure 17 (a) Caves L–B in 1970 and (b) in 2006 (after Higuchi 1984).

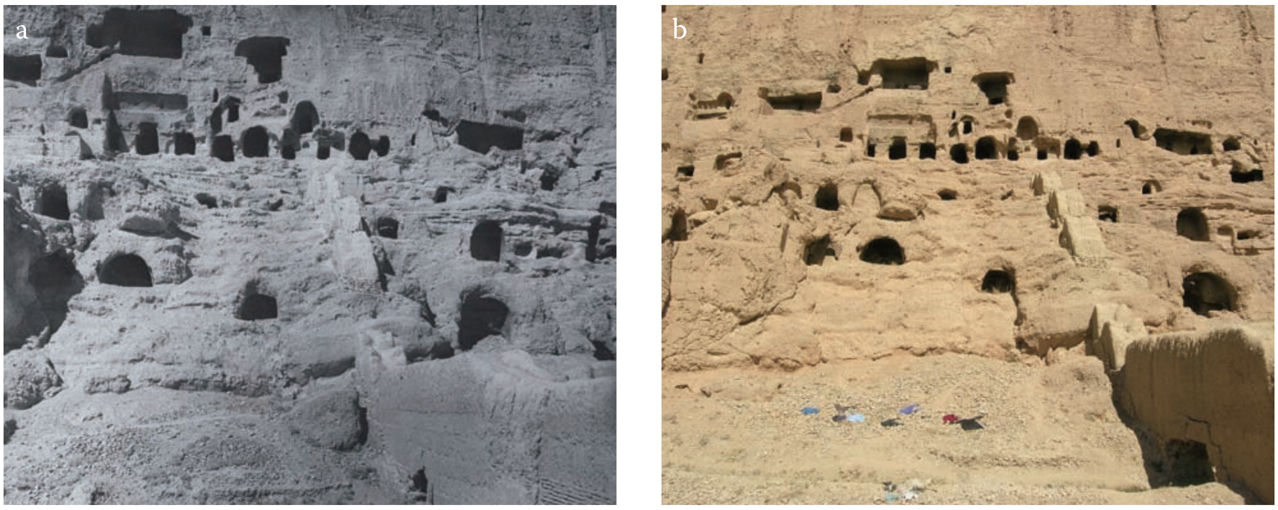


Figure 18 (a) Caves A–F3 in 1970 and (b) in 2006 (after Higuchi 1984).

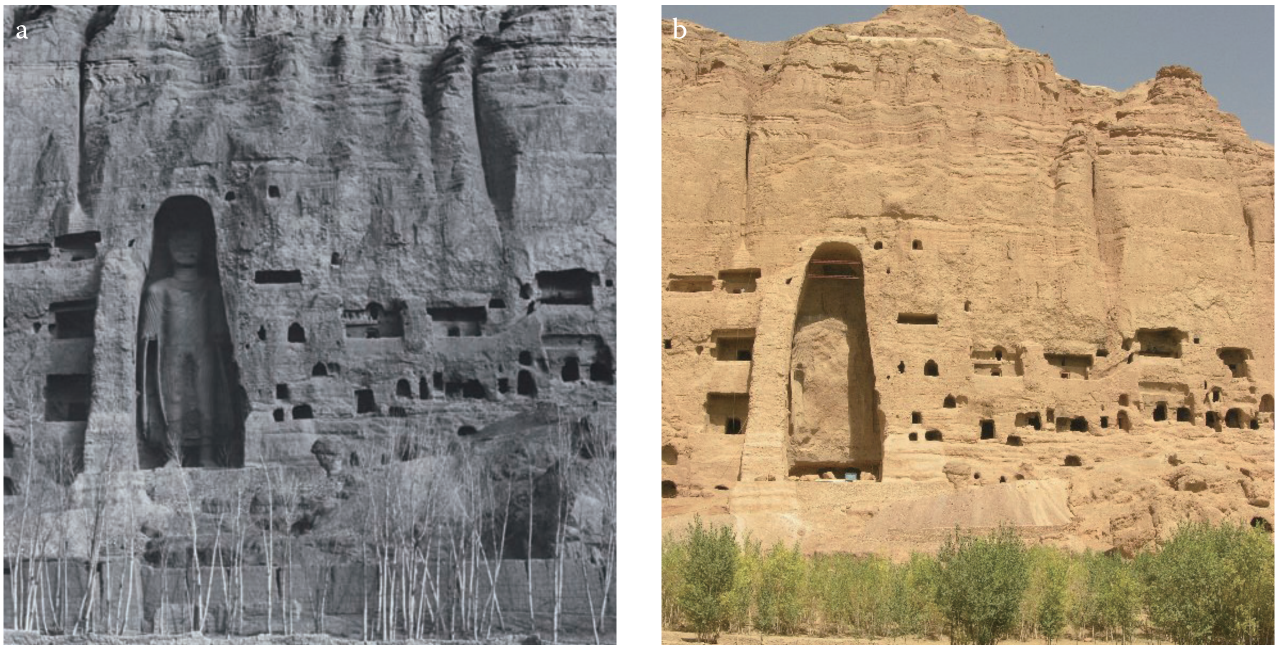


Figure 19 (a) East cave-niche in 1970 and (b) in 2006 (after Higuchi 1984).

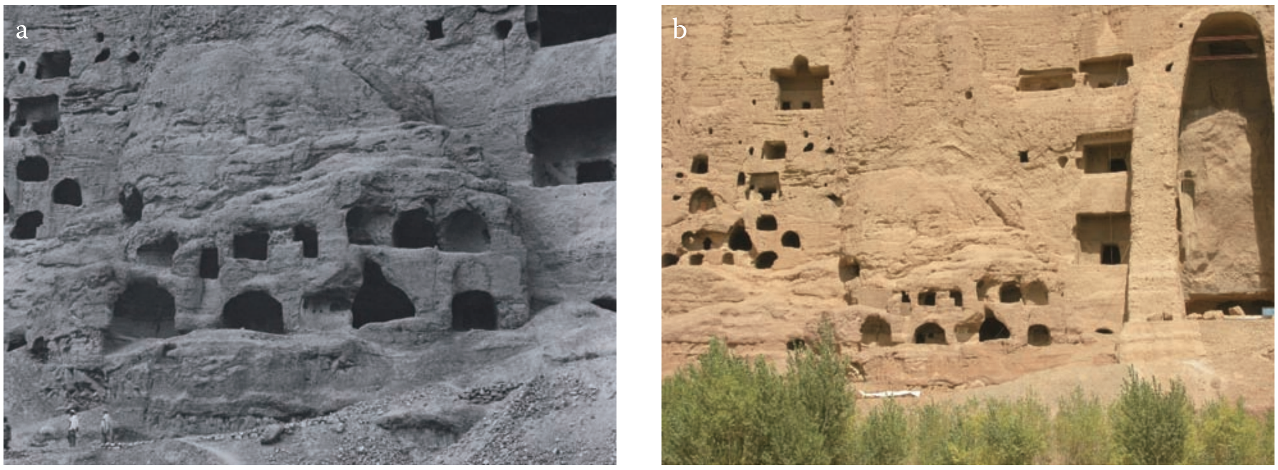


Figure 20 (a) Cave S in 1970 and (b) in 2006 (after Higuchi 1984).

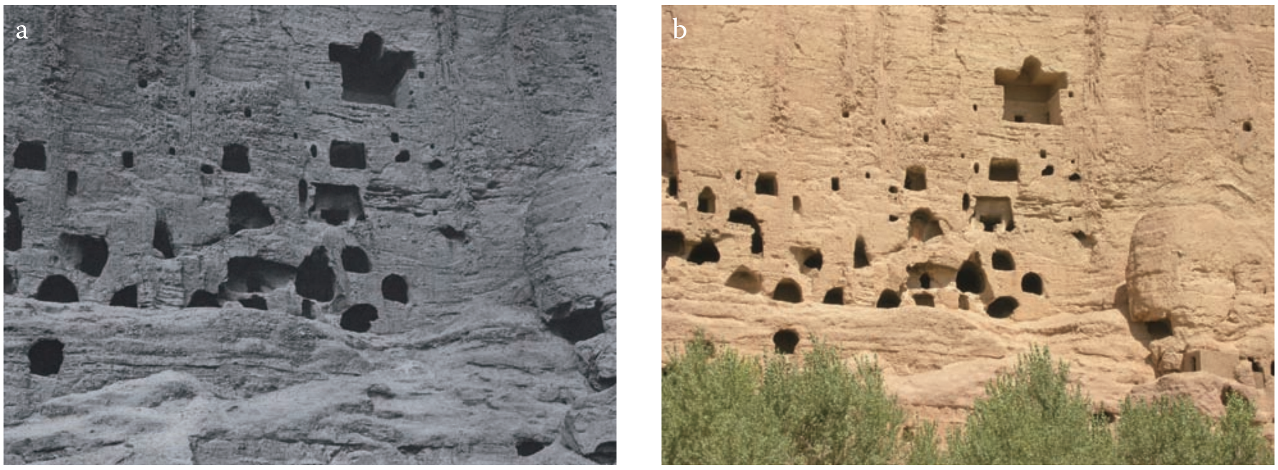


Figure 21 (a) Cave 223 in 1970 and (b) in 2006 (after Higuchi 1984).

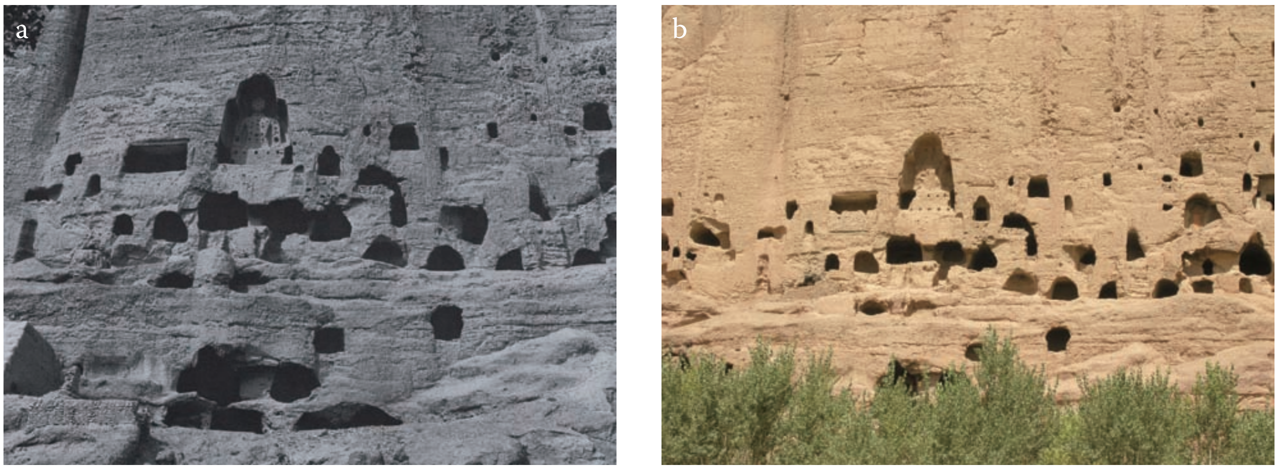


Figure 22 (a) Cave E in 1970 and (b) in 2006 (after Higuchi 1984).

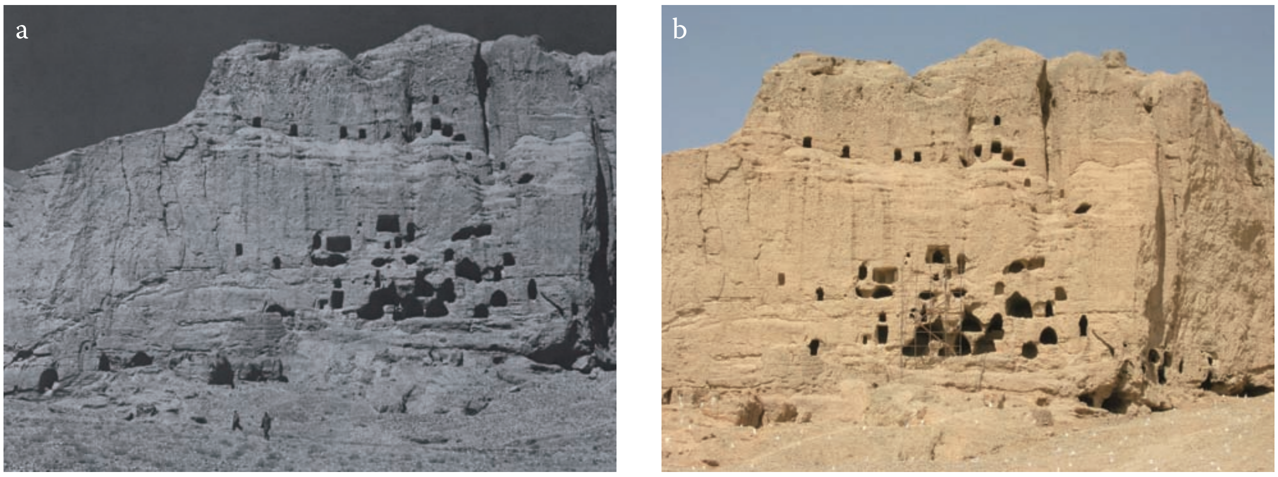


Figure 23 (a) Cave K in 1970 and (b) in 2006 (after Higuchi 1984).

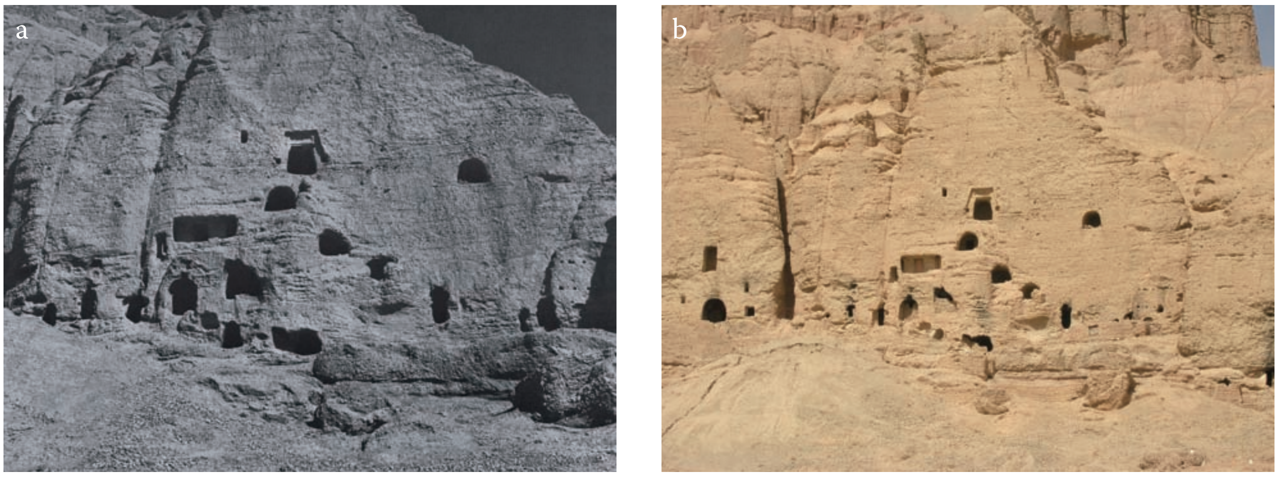


Figure 24 (a) Cave J in 1970 and (b) in 2006 (after Higuchi 1984).

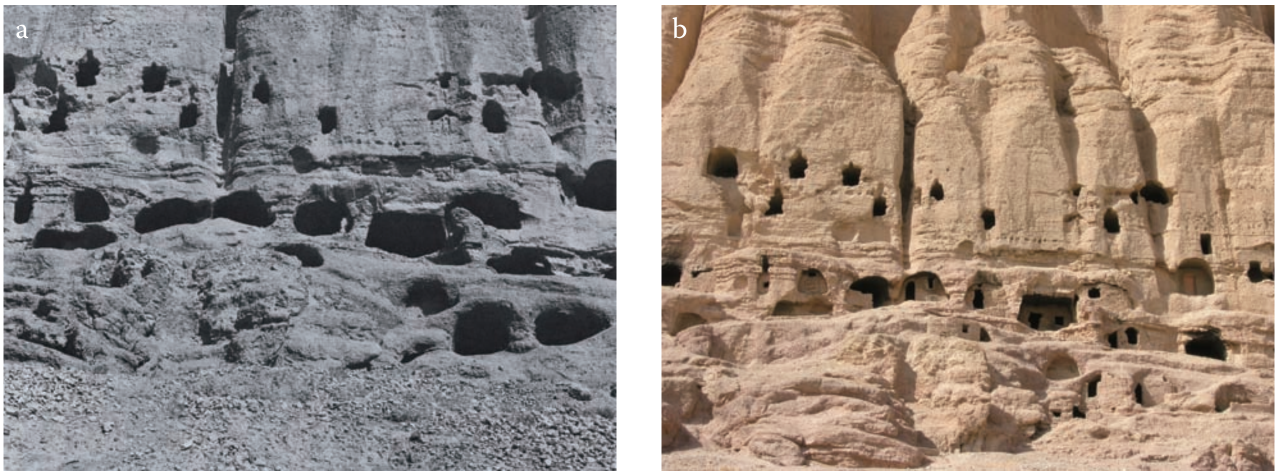


Figure 25 (a) Caves 482–492 in 1970 and (b) in 2006 (after Higuchi 1984).

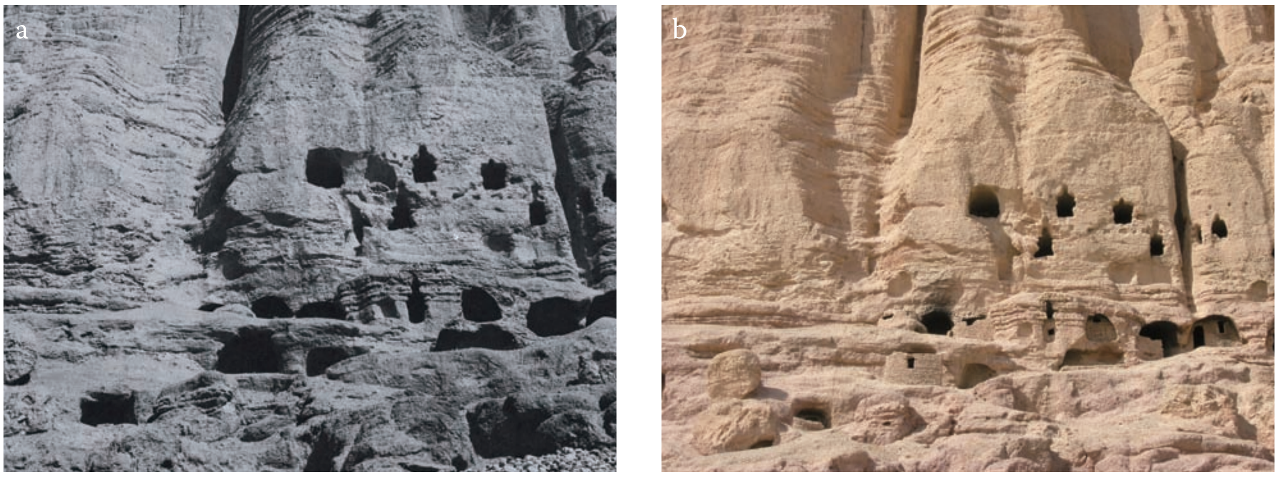


Figure 26 (a) Caves 492–501 in 1970 and (b) in 2006 (after Higuchi 1984).

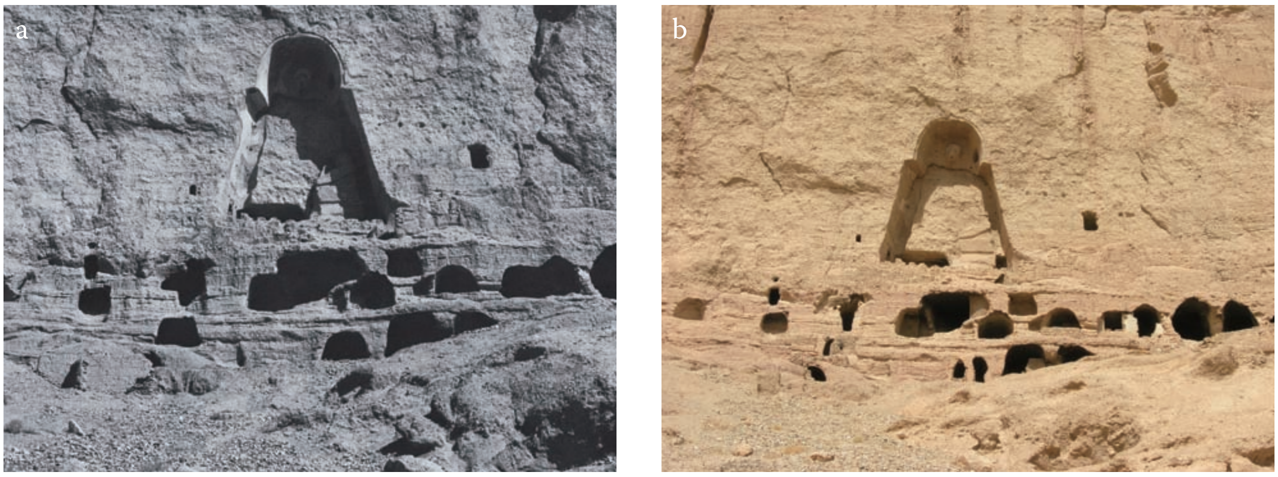


Figure 27 (a) Cave H in 1970 and (b) in 2006 (after Higuchi 1984).

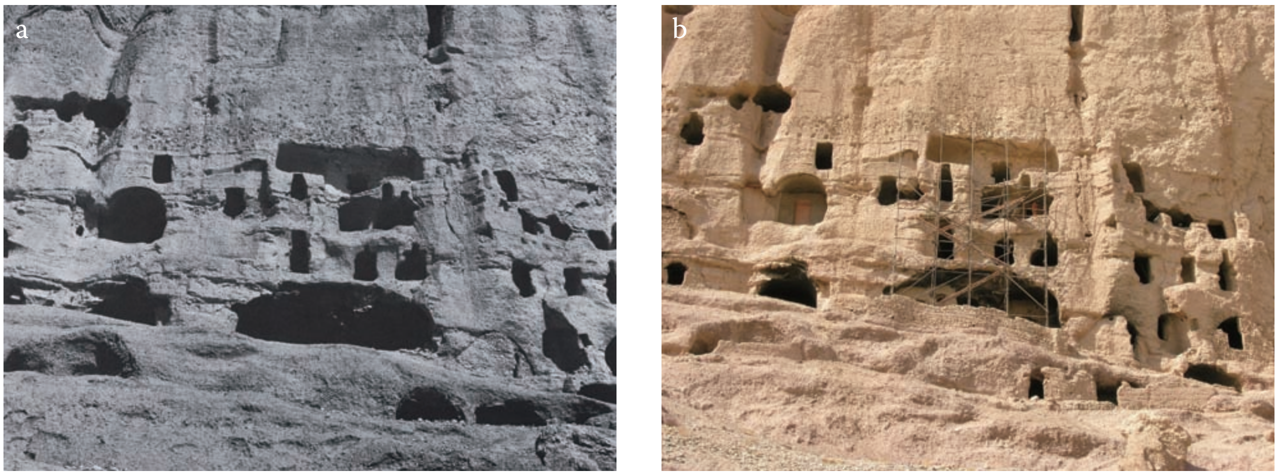


Figure 28 (a) Cave N in 1970 and (b) in 2006 (after Higuchi 1984).

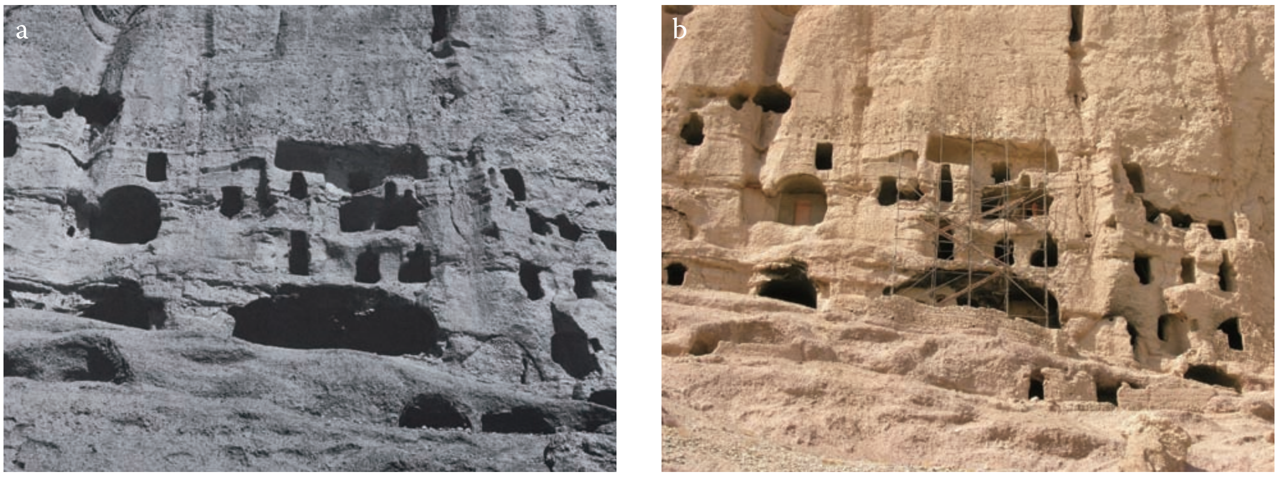


Figure 29 (a) Cave T in 1970 and (b) in 2006 (after Higuchi 1984).

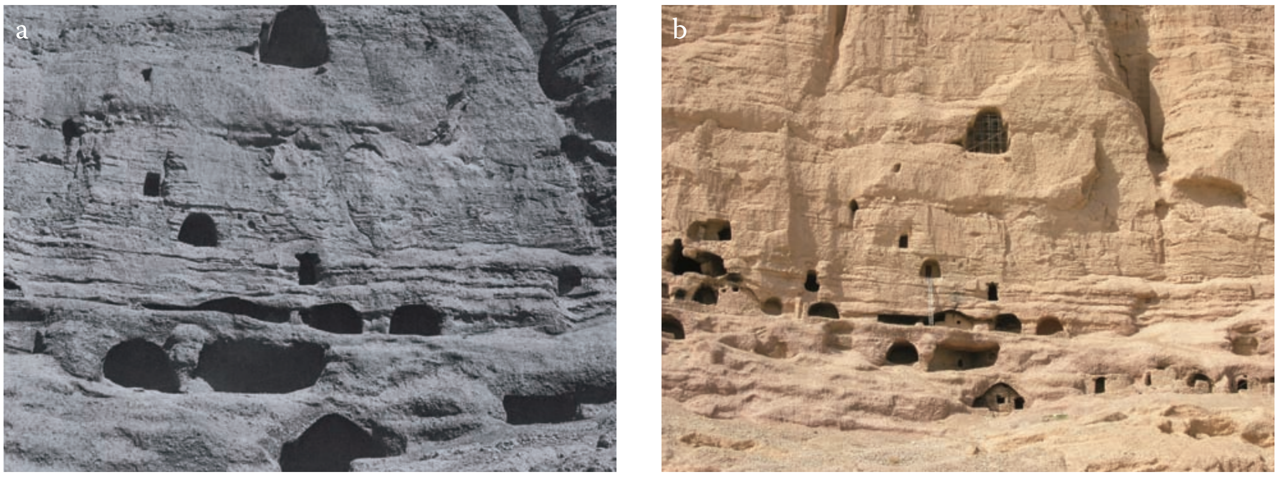


Figure 30 (a) Cave I in 1970 and (b) in 2006 (after Higuchi 1984).

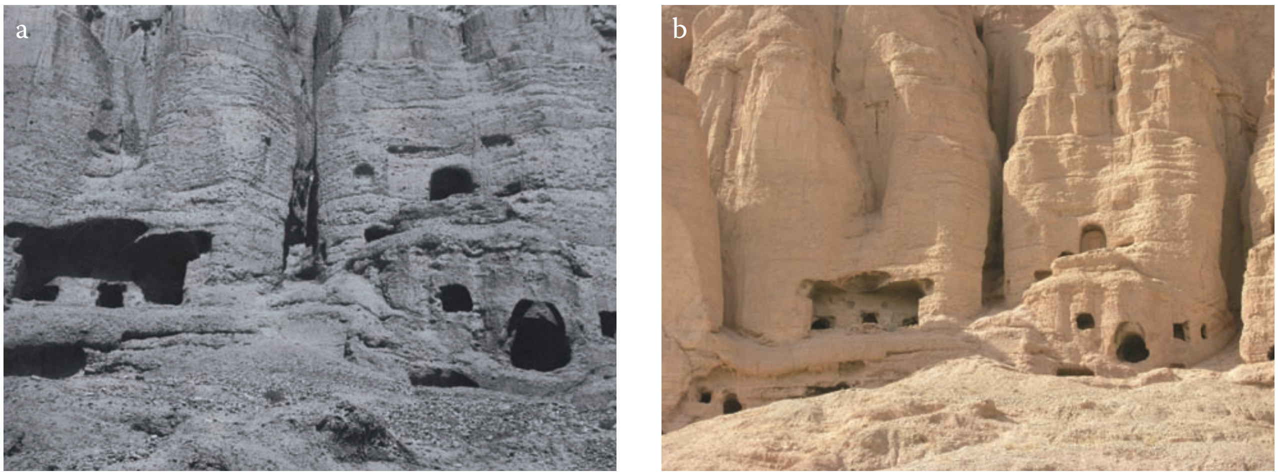


Figure 31 (a) Cave Z1 in 1970 and (b) in 2006 (after Higuchi 1984).

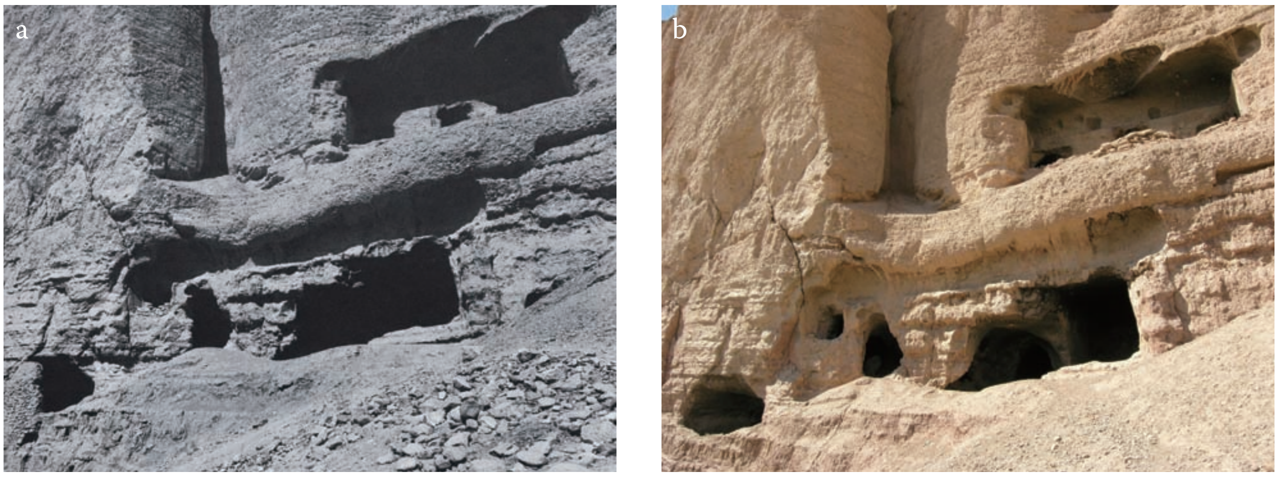


Figure 32 (a) Cave Z in 1970 and (b) in 2006 (after Higuchi 1984).

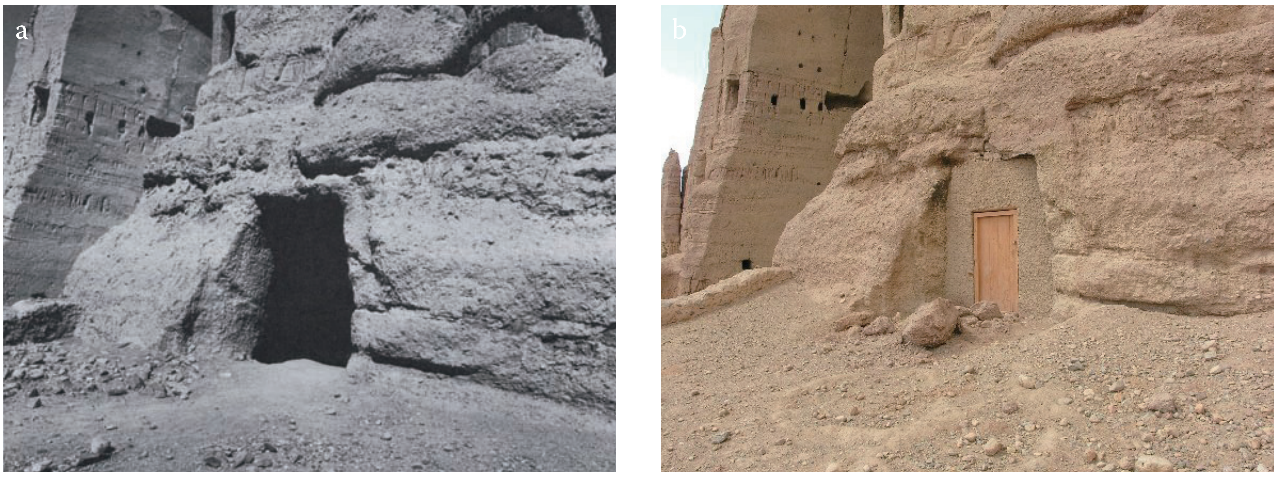


Figure 33 (a) Cave XI in 1970 and (b) in 2006 (after Higuchi 1984).

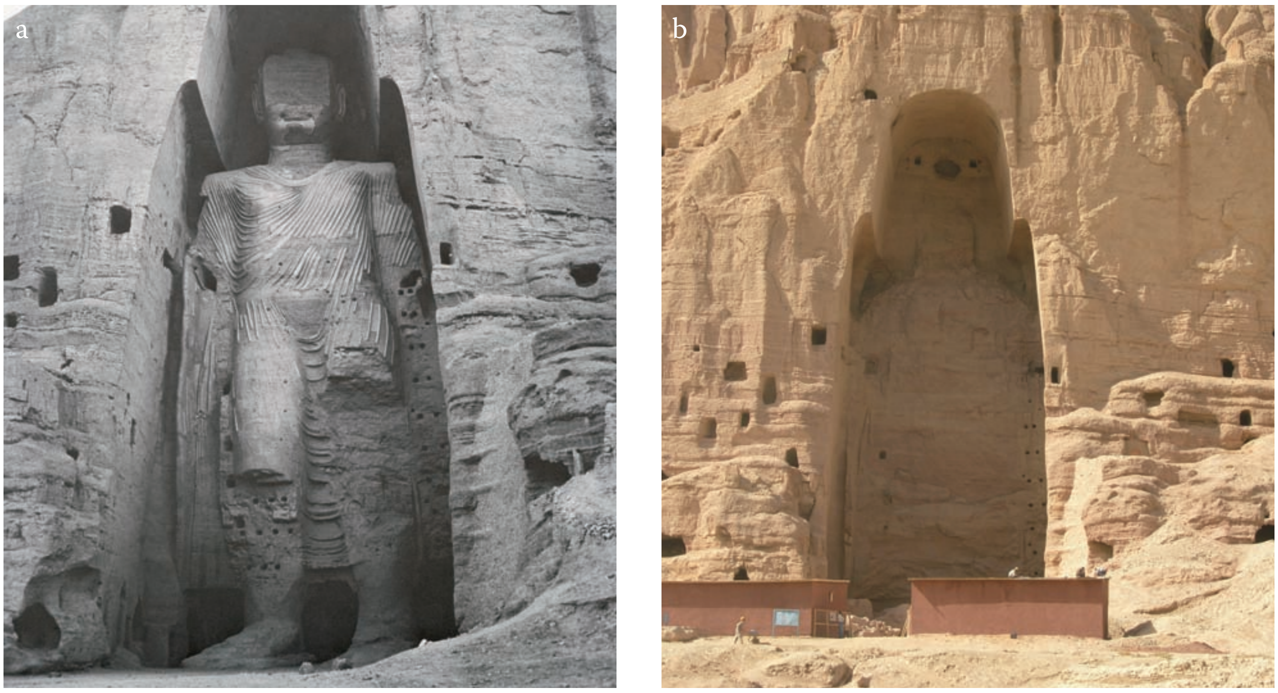


Figure 34 (a) West cave-niche in 1970 and (b) in 2006 (after Higuchi 1984).

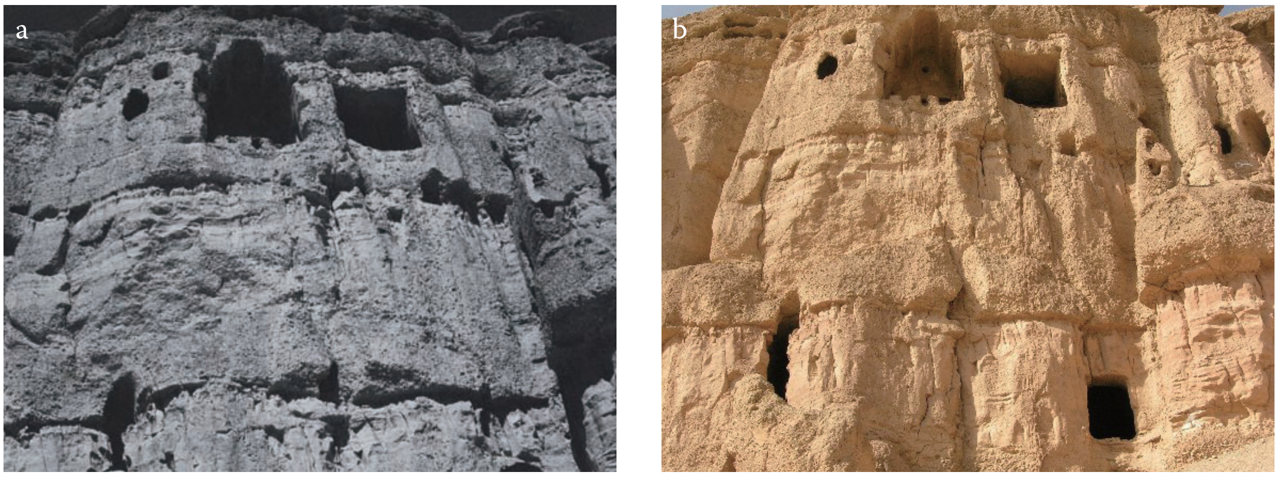


Figure 35 (a) Cave XII in 1970 and (b) in 2006 (after Higuchi 1984).

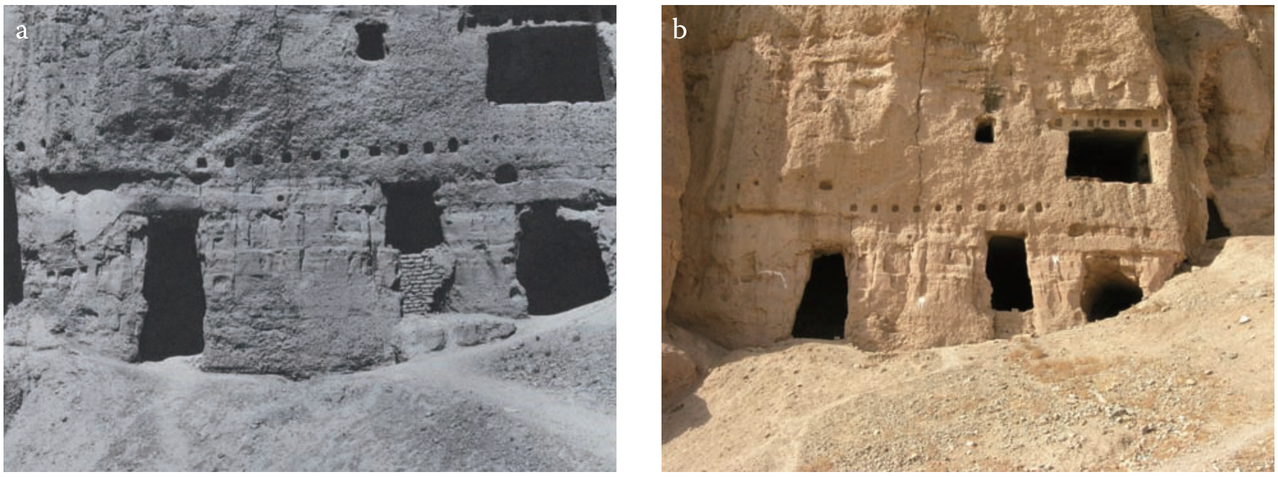


Figure 36 (a) Cave XIII in 1970 and (b) in 2006 (after Higuchi 1984).

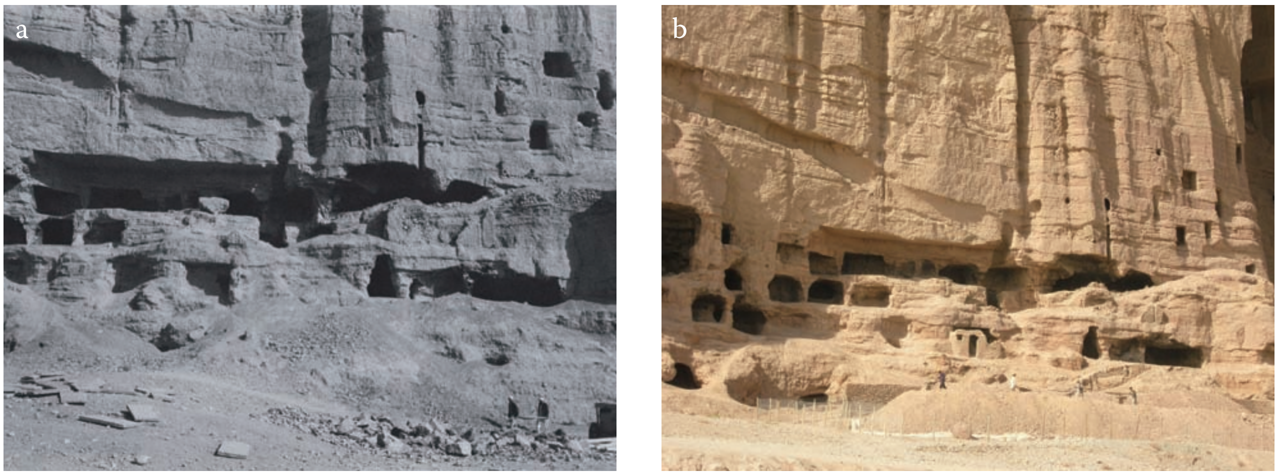


Figure 37 (a) Caves 638–665 in 1970 and (b) in 2006 (after Higuchi 1984).

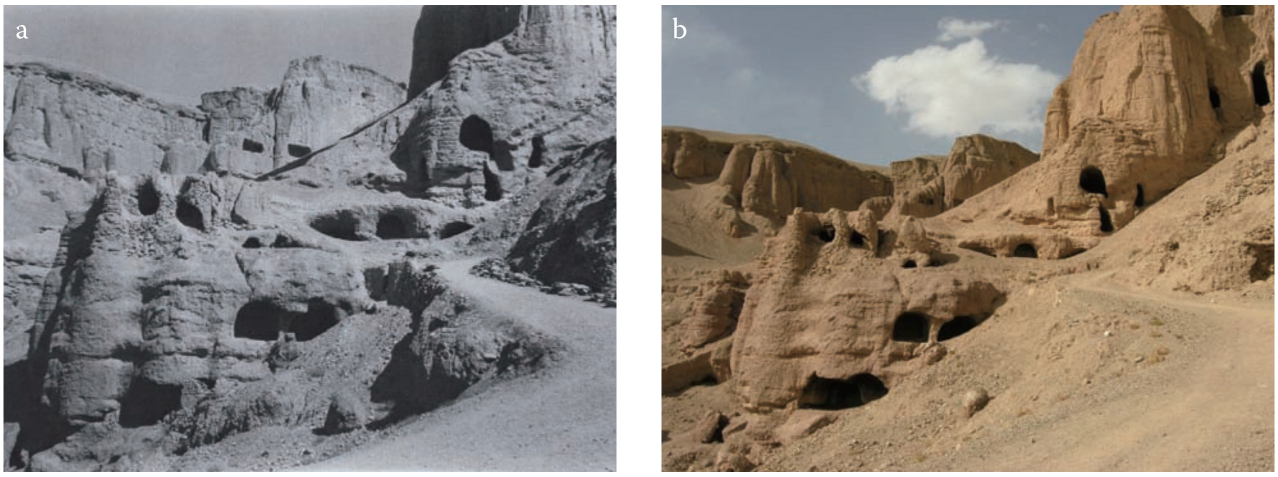


Figure 38 (a) Western edge in 1970 and (b) in 2006 (after Higuchi 1984).

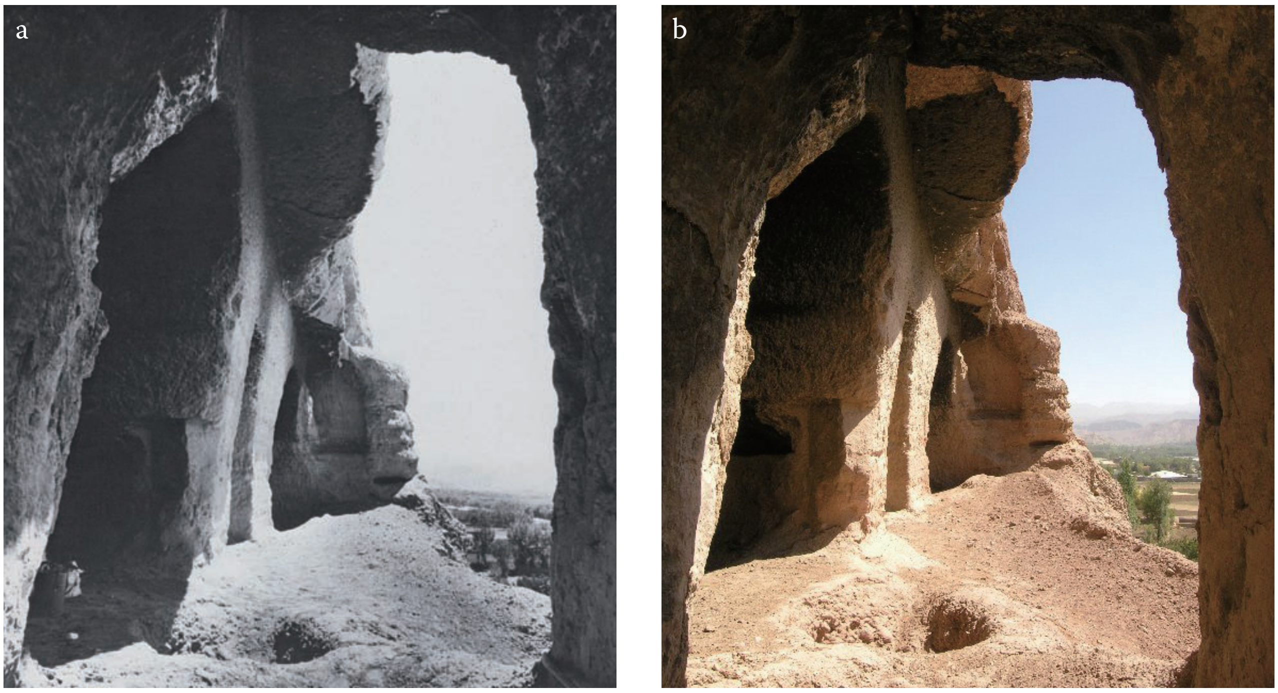


Figure 39 (a) Cave V(e) in 1970 and (b) in 2006 (after Higuchi 1984).

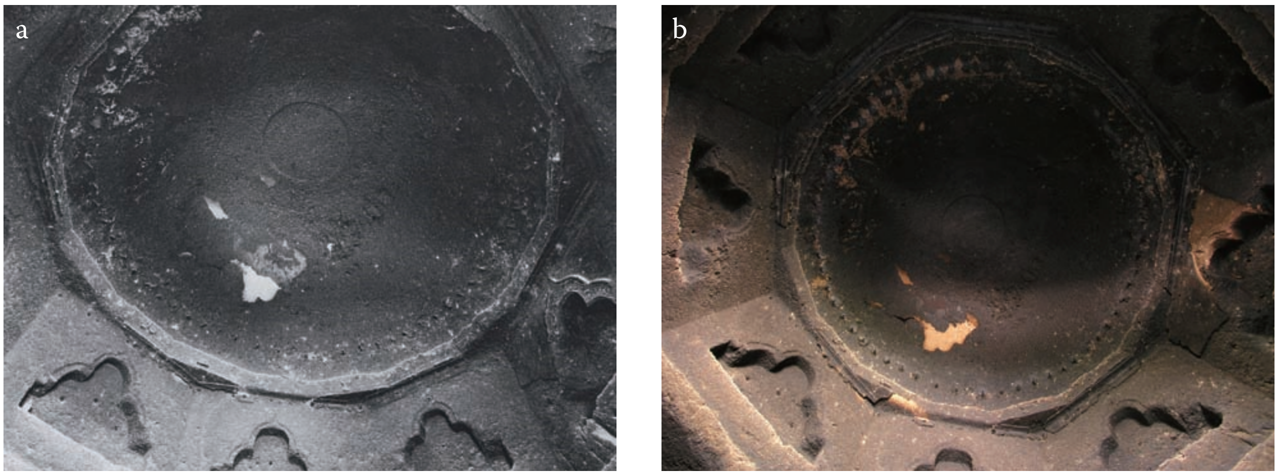


Figure 40 (a) Cave U in 1970 and (b) in 2006 (after Higuchi 1984).

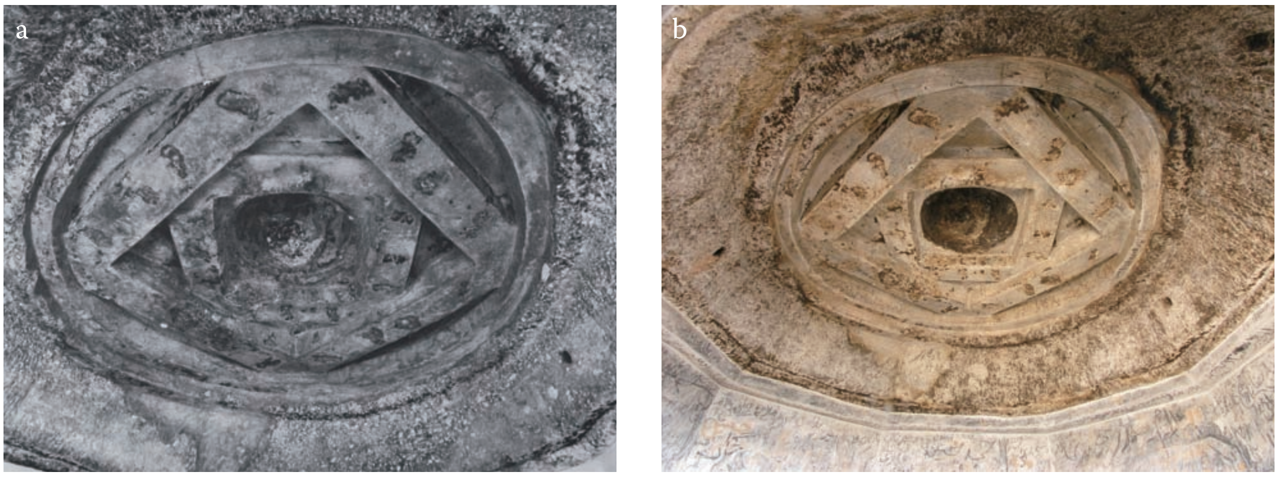


Figure 41 (a) Cave A(a) in 1970 and (b) in 2006 (after Higuchi 1984).

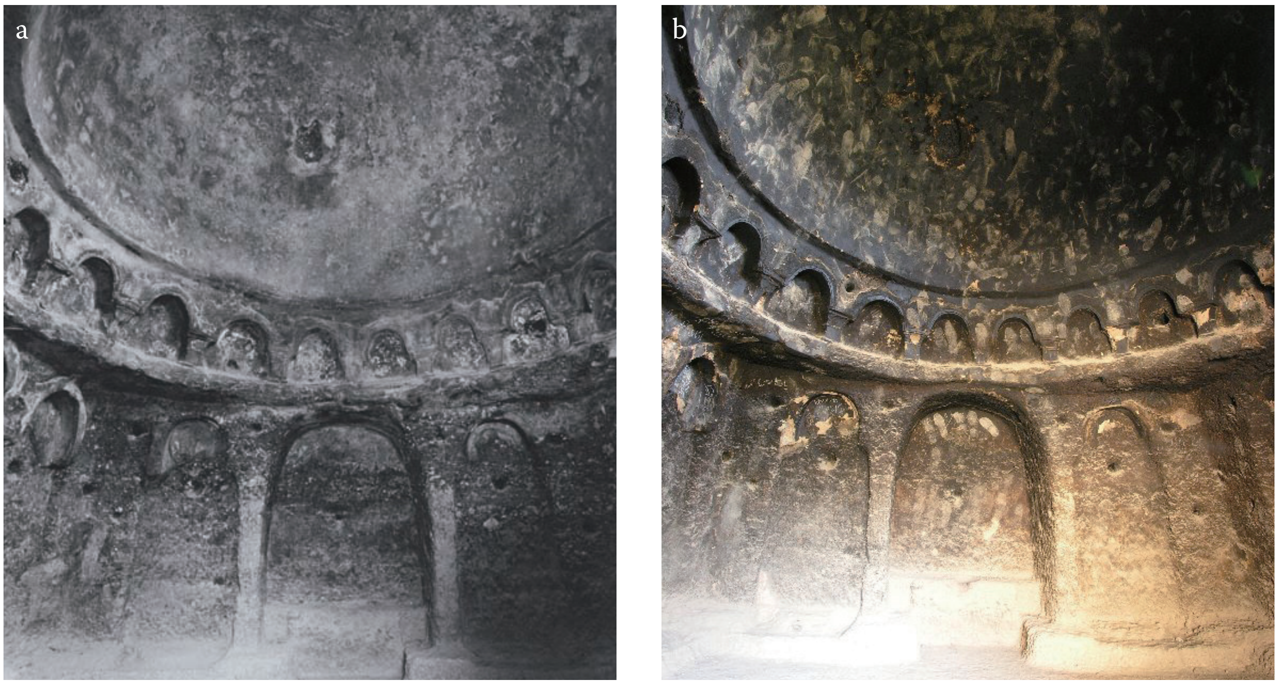


Figure 42 (a) Cave A(c) in 1970 and (b) in 2006 (after Higuchi 1984).

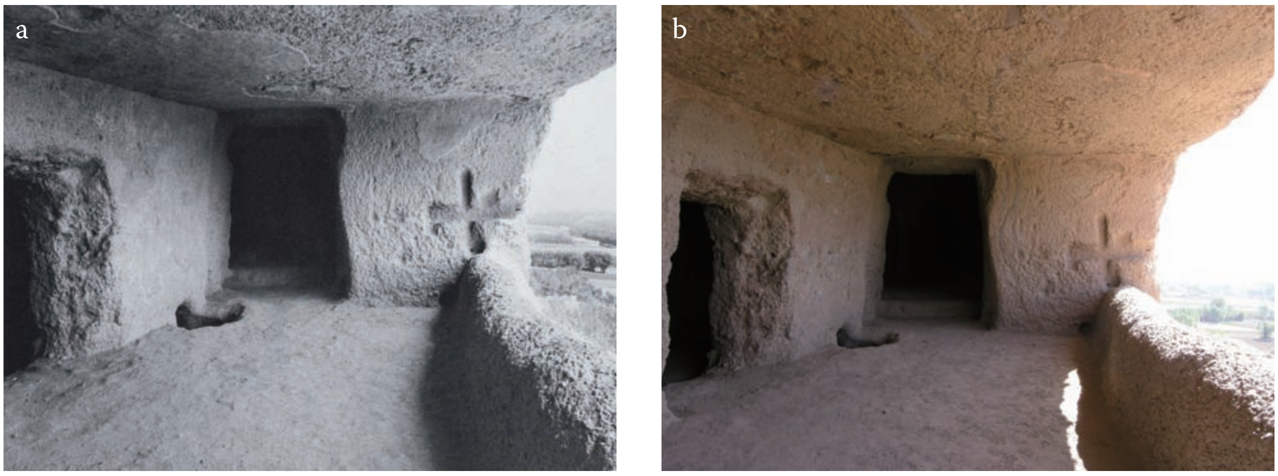


Figure 43 (a) Cave B1(c) in 1970 and (b) in 2006 (after Higuchi 1984).

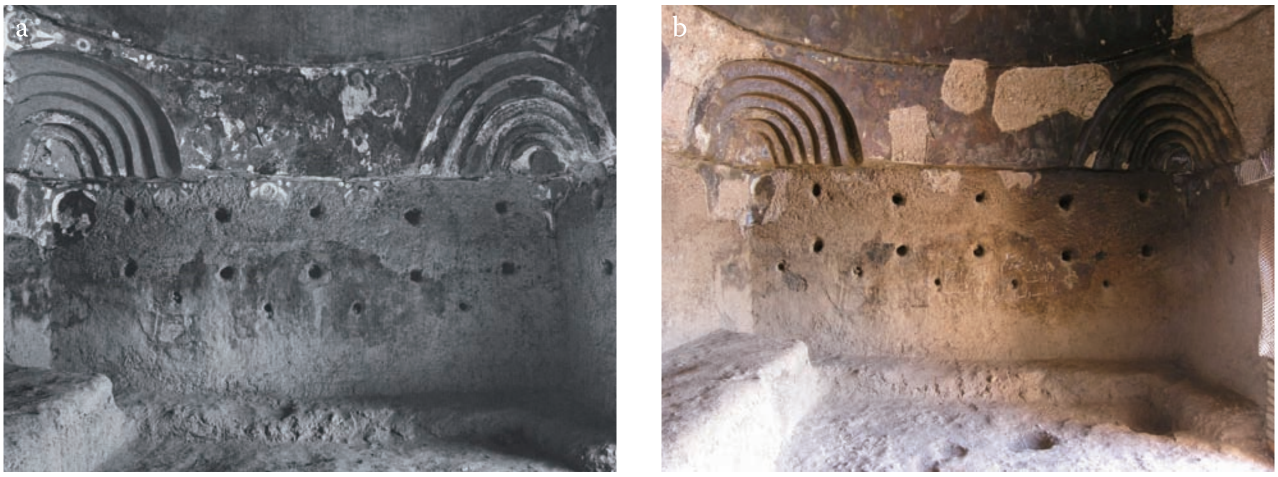


Figure 44 (a) Cave A(a) in 1970 and (b) in 2006 (after Higuchi 1984).

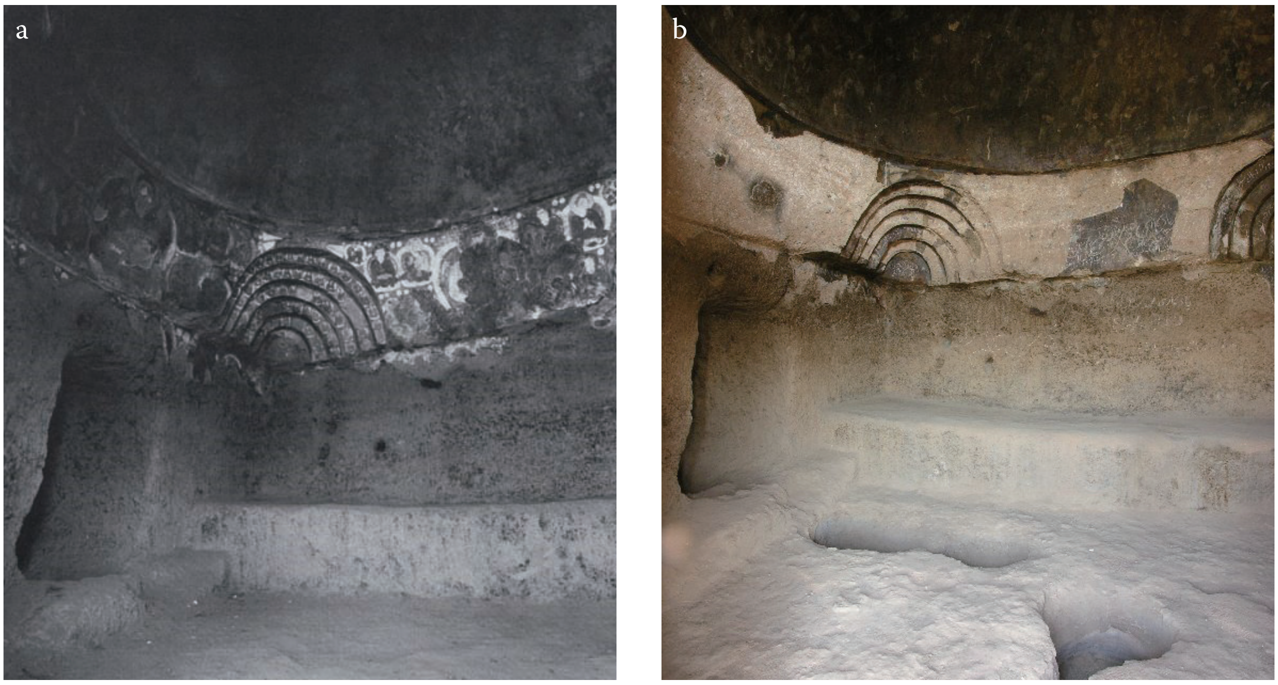


Figure 45 (a) Cave A(a) in 1970 and (b) in 2006 (after Higuchi 1984).

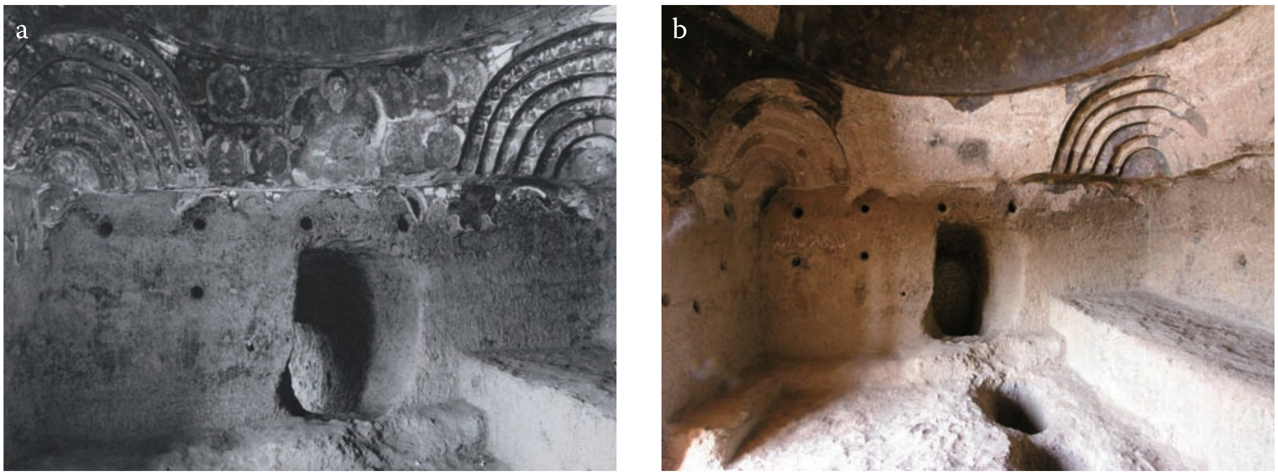


Figure 46 (a) Cave A(a) in 1970 and (b) in 2006 (after Higuchi 1984).

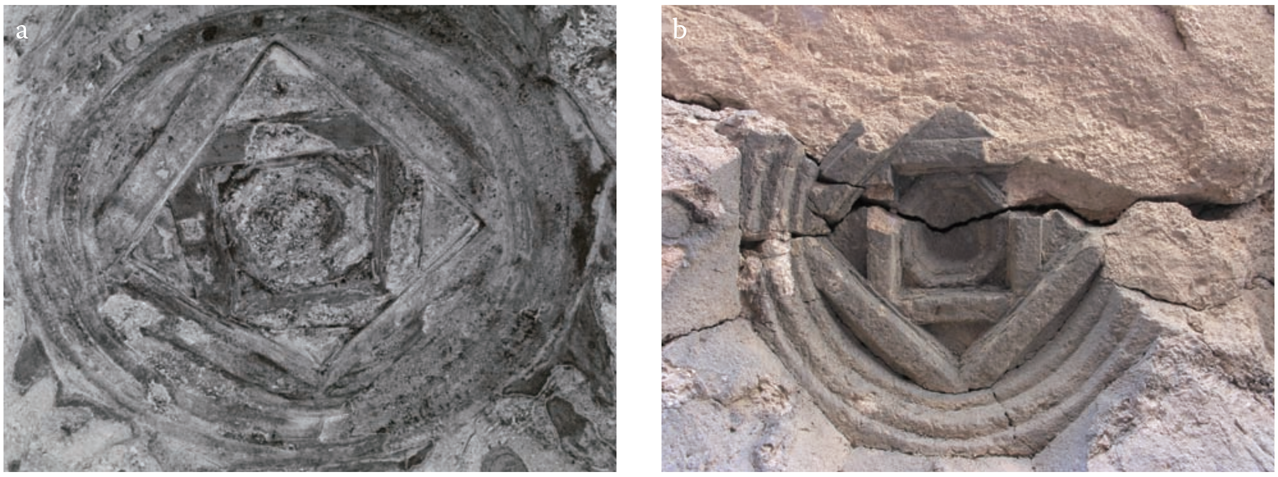


Figure 47 (a) Cave 35-I in 1970 and (b) in 2006 (after Higuchi 1984).

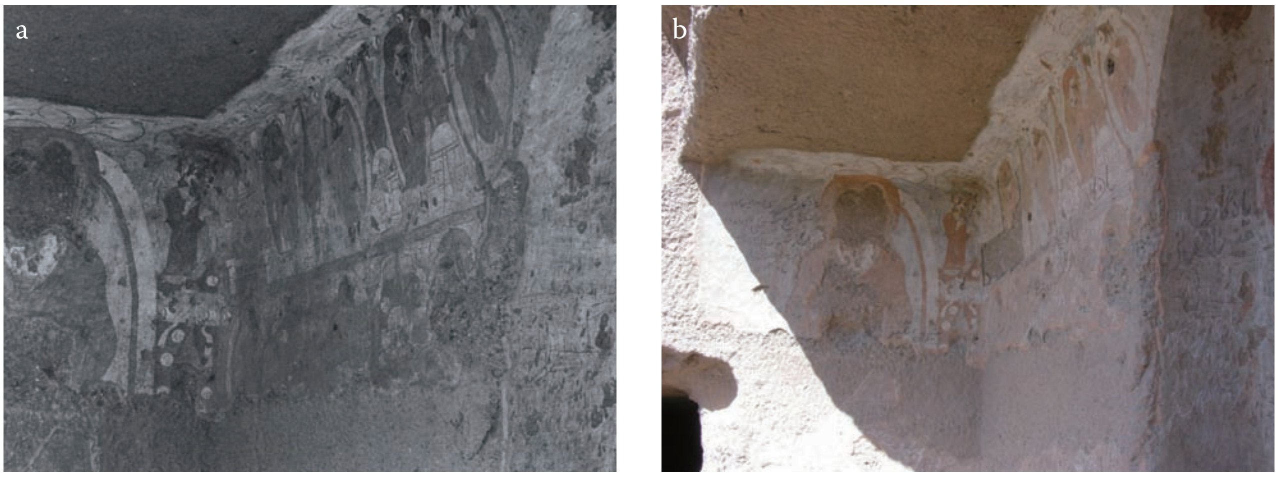


Figure 48 (a) Cave C(a) in 1970 and (b) in 2006 (after Higuchi 1984).

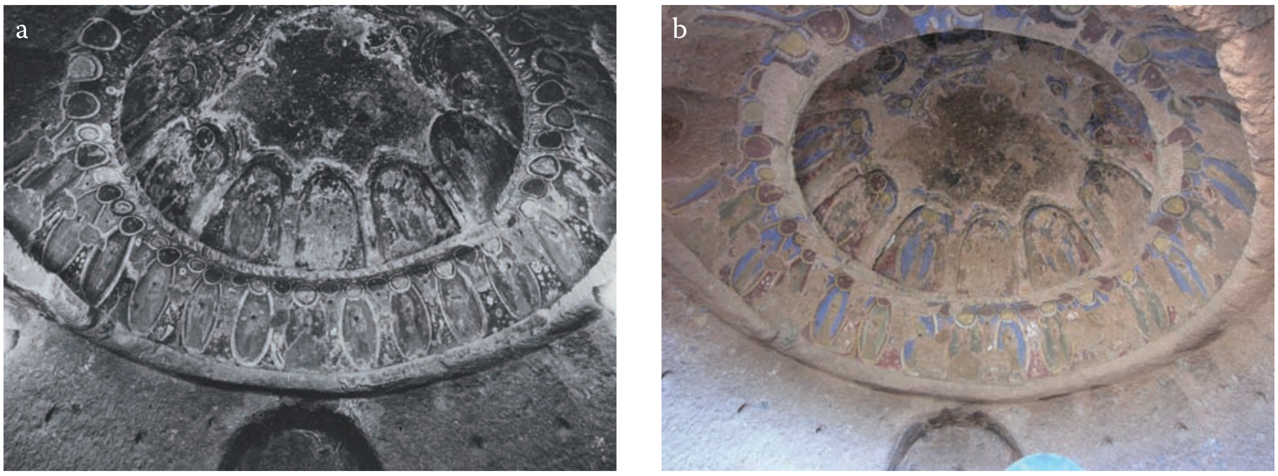


Figure 49 (a) Cave C(b) in 1970 and (b) in 2006 (after Higuchi 1984).

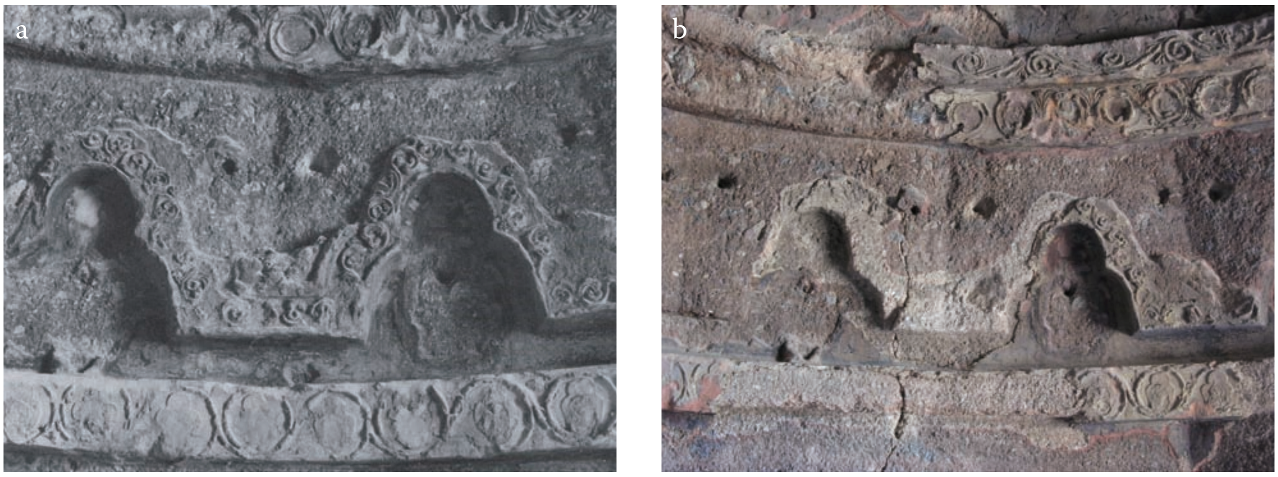


Figure 50 (a) Cave F in 1970 and (b) in 2006 (after Higuchi 1984).

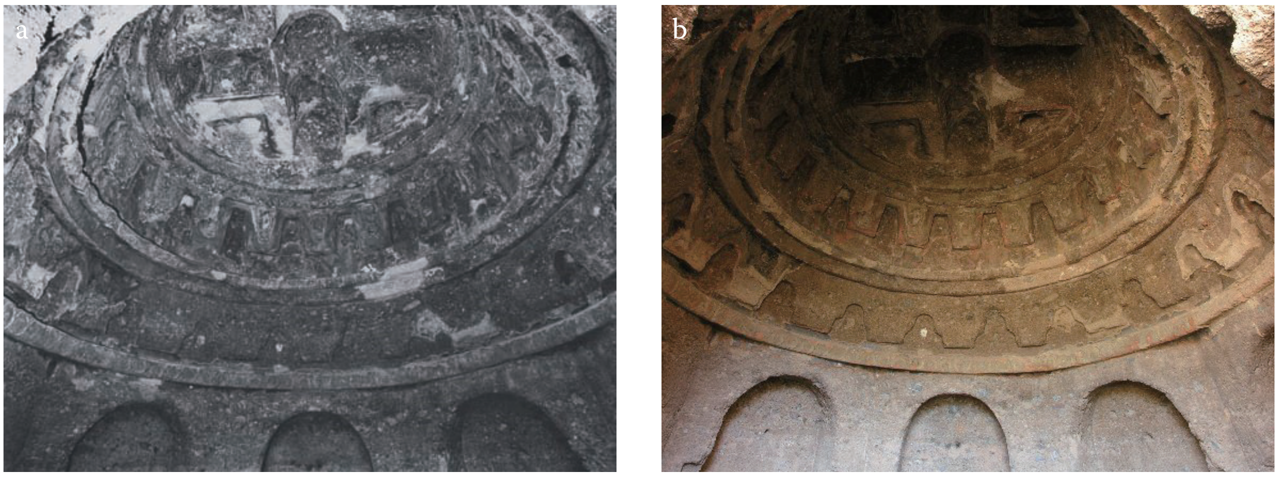


Figure 51 (a) Cave D in 1970 and (b) in 2006 (after Higuchi 1984).

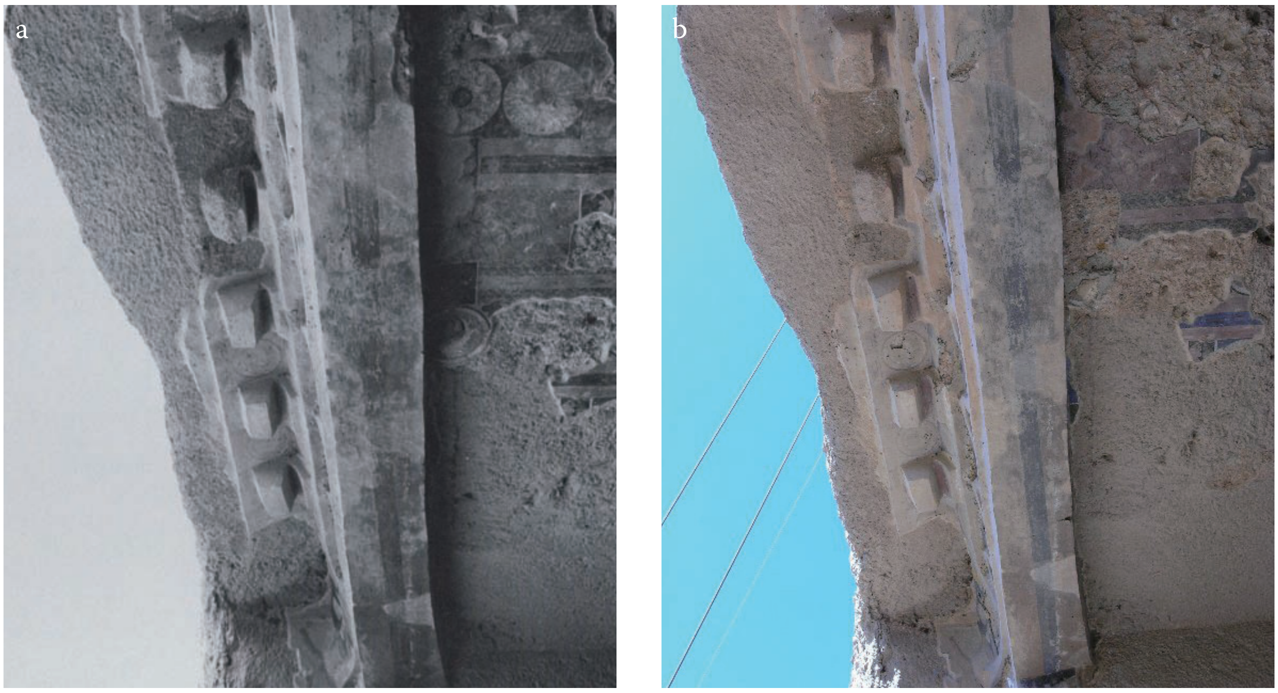


Figure 52 (a) Cave D in 1970 and (b) in 2006 (after Higuchi 1984).

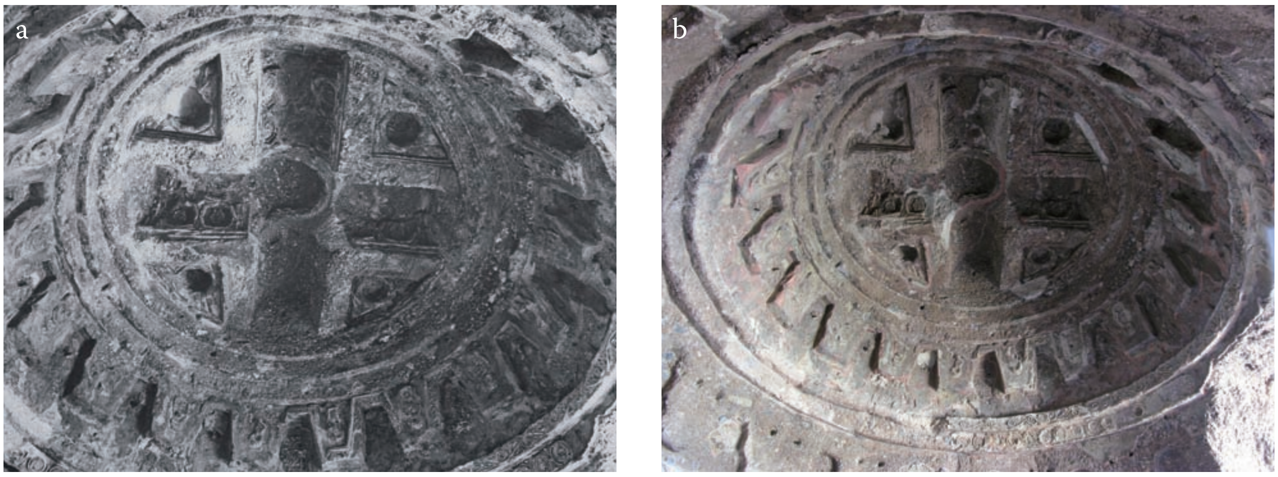


Figure 53 (a) Cave D in 1970 and (b) in 2006 (after Higuchi 1984).

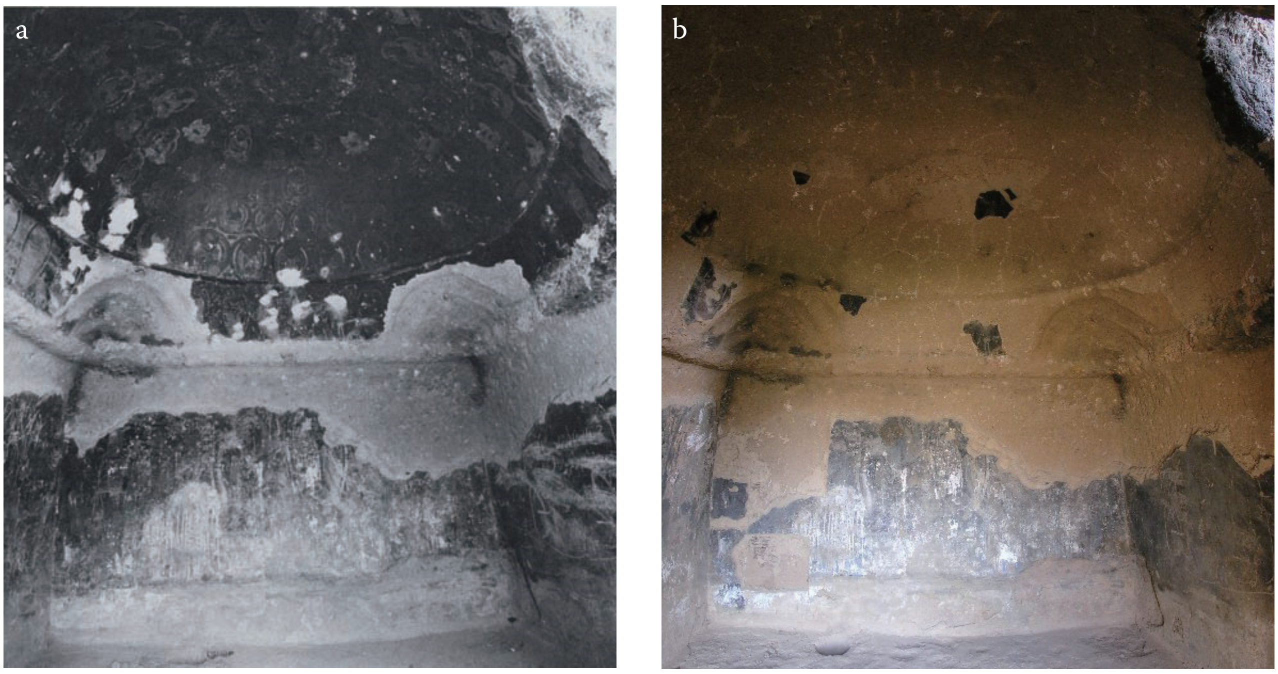


Figure 54 (a) Cave E(e) in 1970 and (b) in 2006 (after Higuchi 1984).

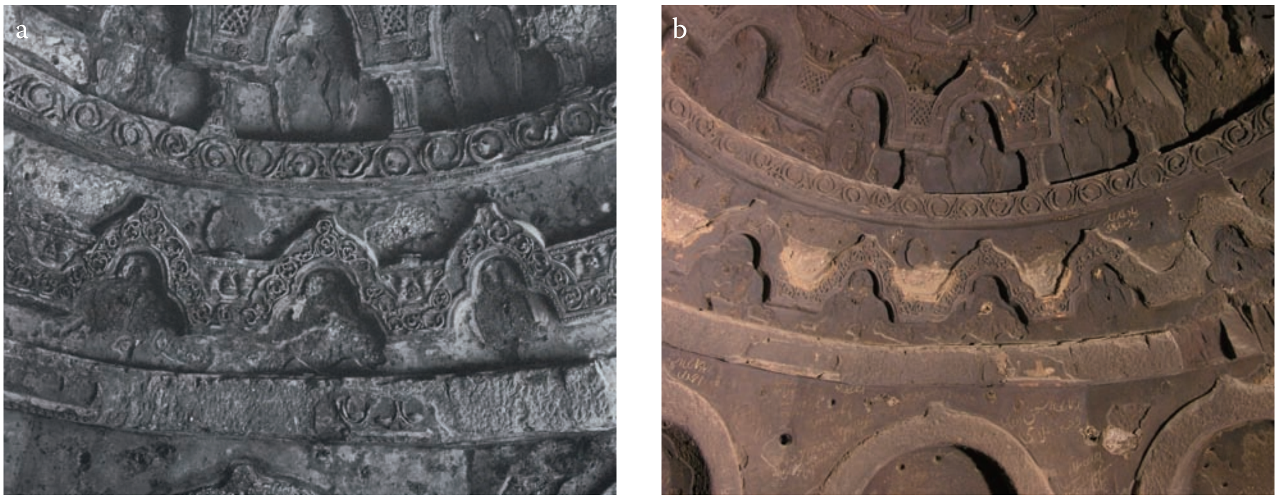


Figure 55 (a) Cave XI in 1970 and (b) in 2006 (after Higuchi 1984).

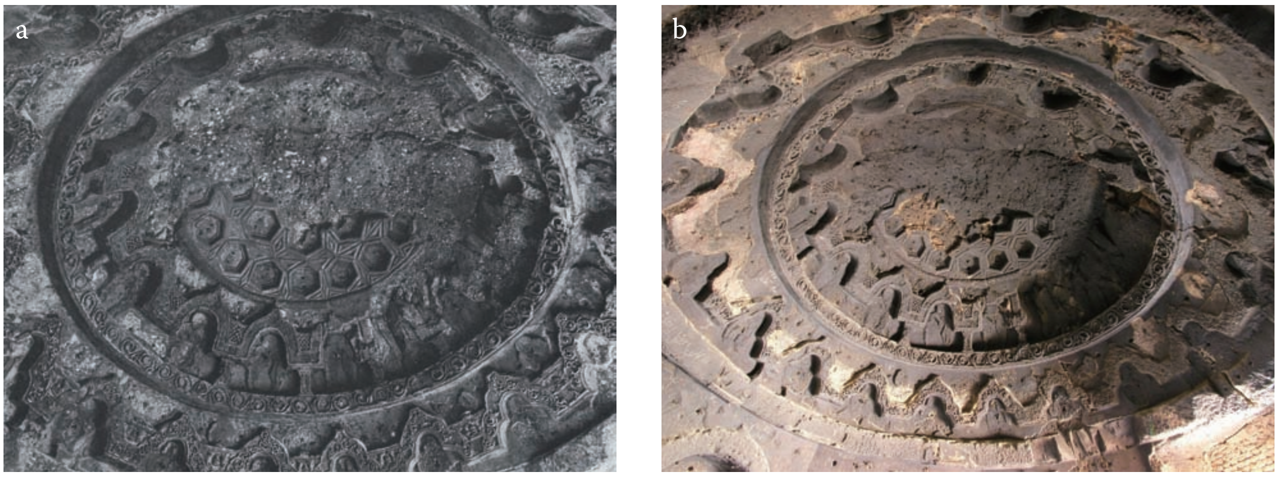


Figure 56 (a) Cave XI in 1970 and (b) in 2006 (after Higuchi 1984).

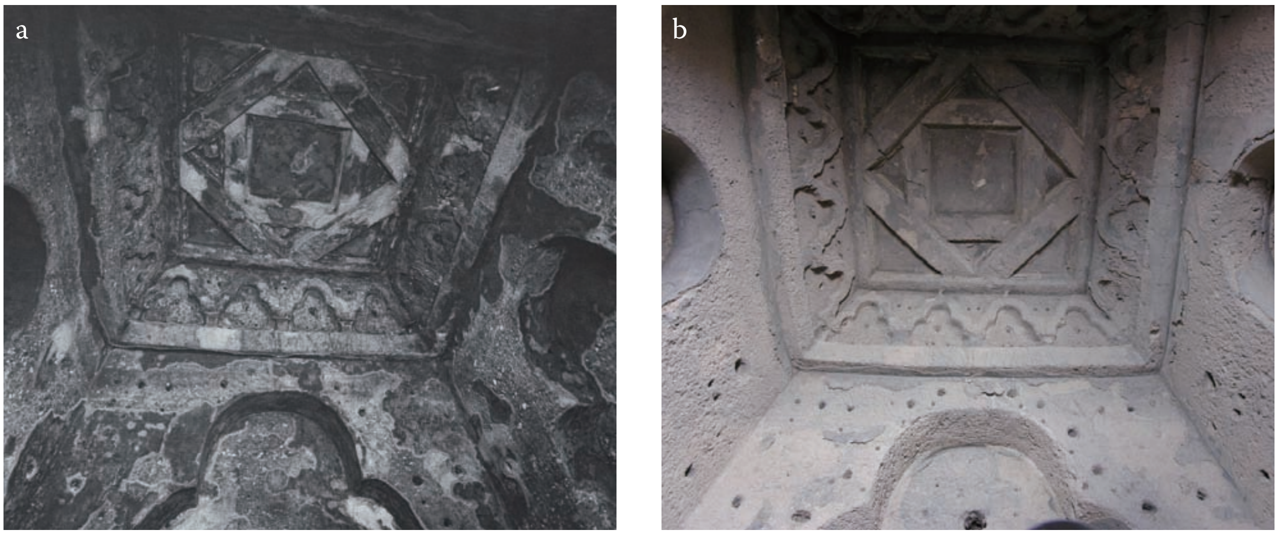


Figure 57 (a) Cave 53–V in 1970 and (b) in 2006 (after Higuchi 1984).

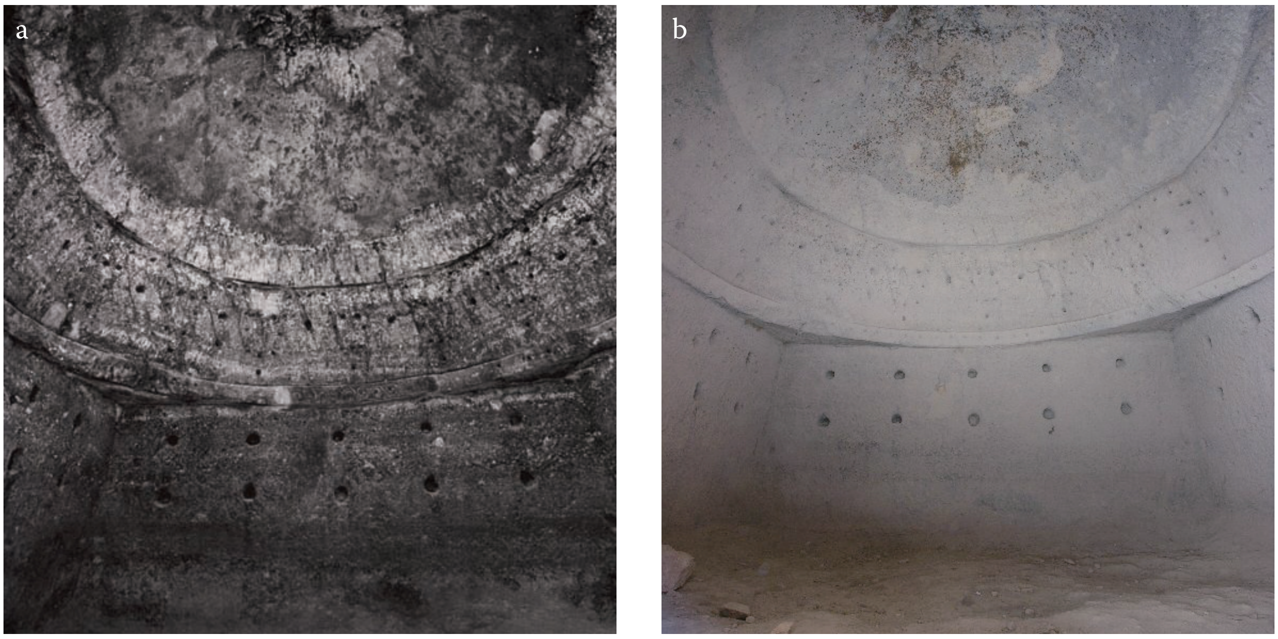


Figure 58 (a) Cave 53-IV in 1970 and (b) in 2006 (after Higuchi 1984).

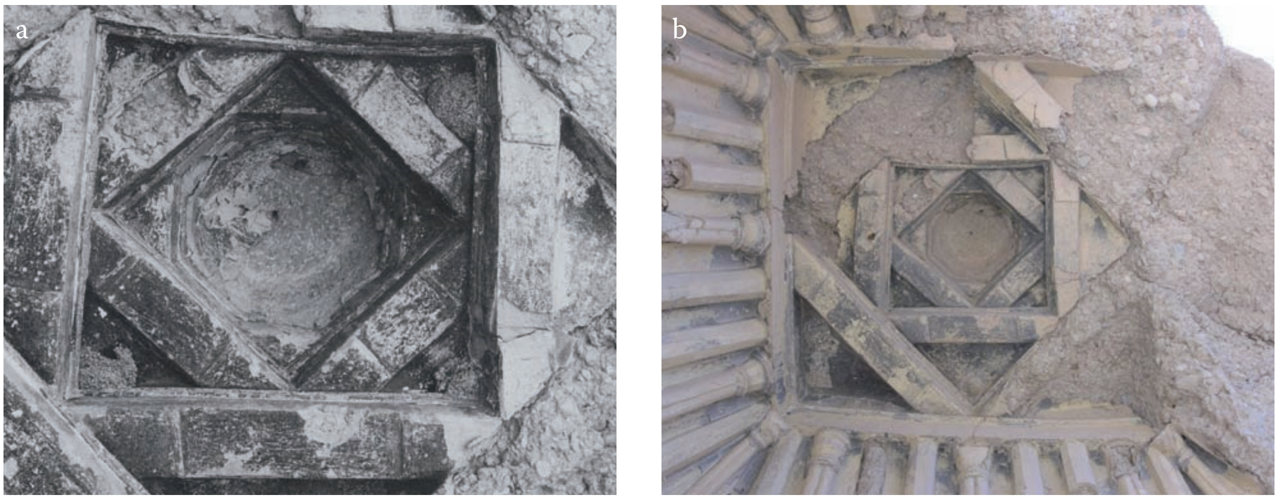


Figure 59 (a) Cave XV(b) in 1970 and (b) in 2006 (after Higuchi 1984).

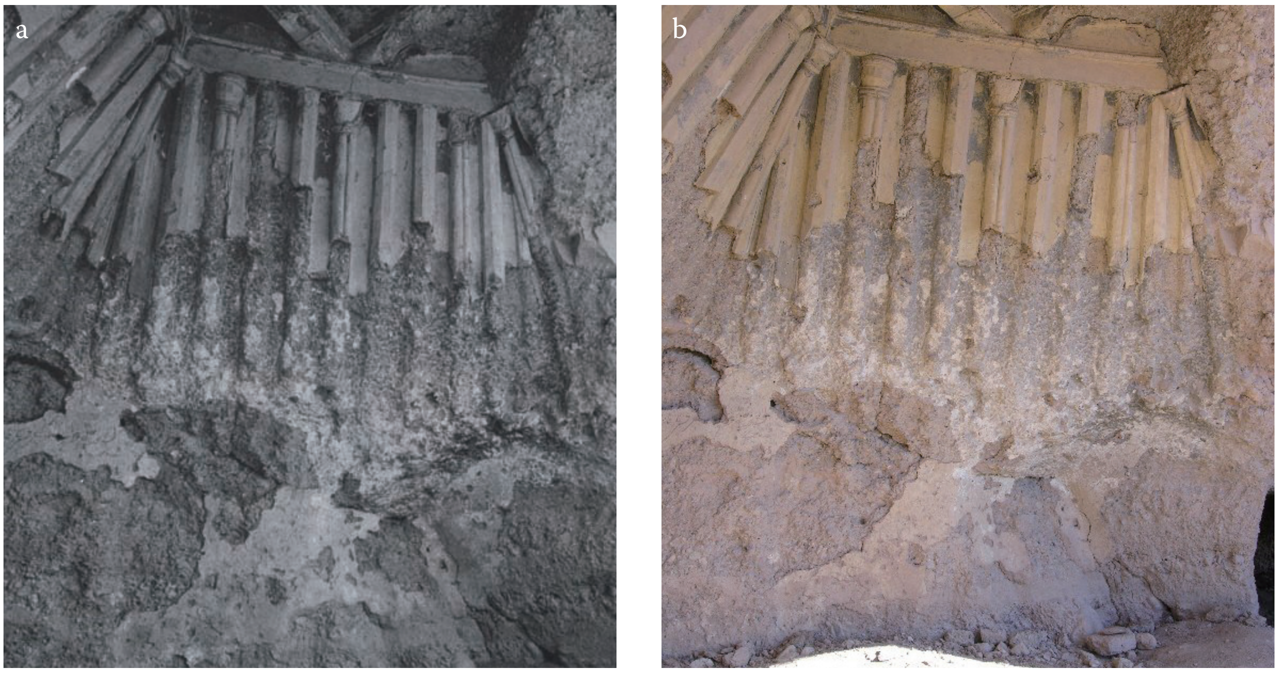


Figure 60 (a) Cave XV(b) in 1970 and (b) in 2006 (after Higuchi 1984).

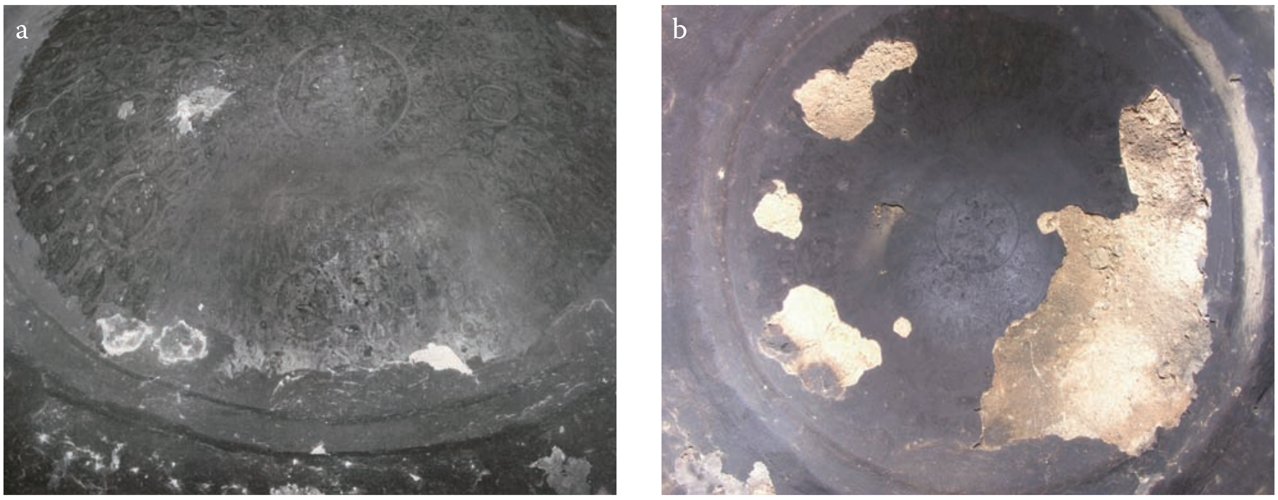


Figure 61 (a) Cave Z1 in 1970 and (b) in 2006 (after Higuchi 1984).

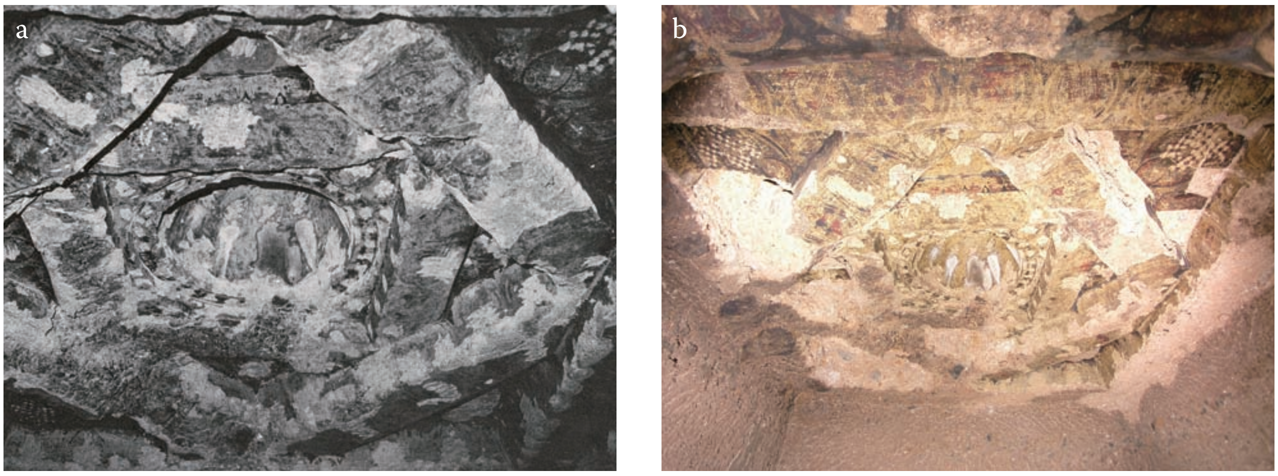


Figure 62 (a) Cave F(c) in 1970 and (b) in 2006 (after Higuchi 1984).

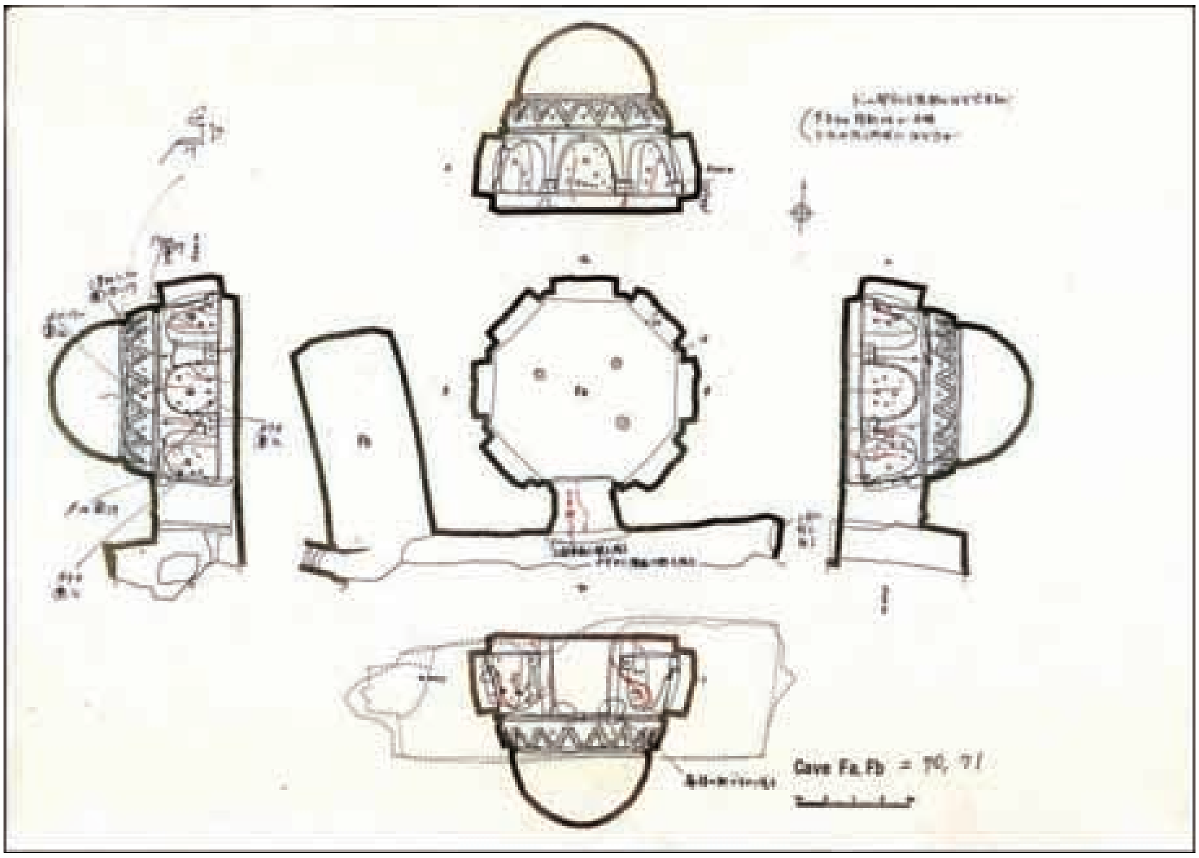
Chapter 4 Details of the caves on the Great Cliff in Bamiyan

Kyoto University researchers counted more than 750 caves on the Great Cliff in Bamiyan. These caves are highly stimulating from the viewpoints of architectonics and art history because of their various forms; nevertheless, their future is uncertain because of the threat of weathering and other damage. Thus, the forms, techniques, designs and present condition of these caves were surveyed in order to record their current status. This documentation should provide crucial data for future decisions about which caves should be opened to the public and which have the greatest conservation management needs. In total, 157 of the accessible caves were chosen because their forms and designs are architecturally unique.

The content of the documentation is as follows:

1 Basic information
2 Basic form
3 Details
4 Conservation status
5 Date of construction
6 Drawings
7 Photographic recording
8 Remarks
9 Sketch and data
10 Date of survey and name of investigator

The caves without any drawings, and those with only meaningful traces such as holes supporting wooden structures, have so far only been partially measured. In addition, over 4,000 photos of the caves were taken in 2006 for conversion into digital images. These photos document the walls, ceilings, floors, front rooms and entrances of the caves. The following text provides details of the main caves east of the Great Cliff in Bamiyan in terms of form, design and technique, as well as their present condition.



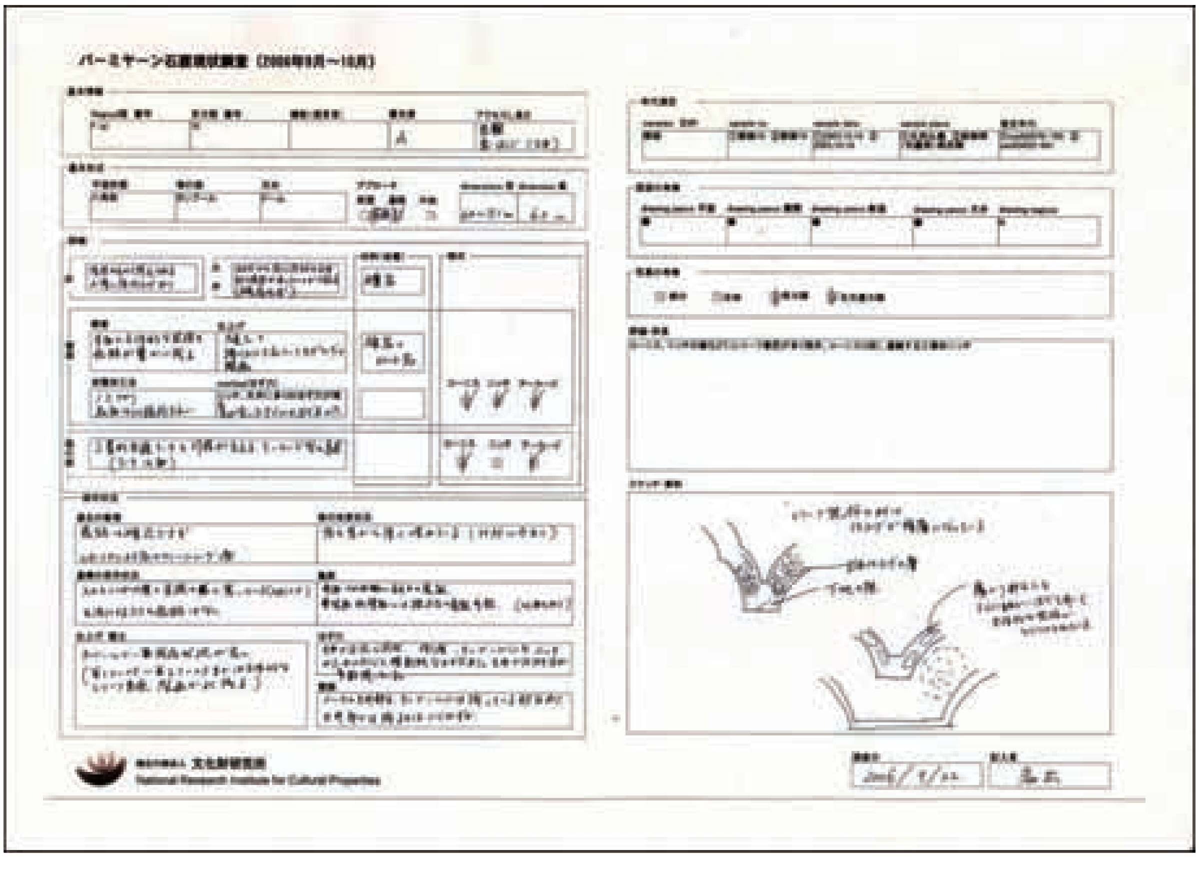

National Research Institute for Cultural Properties

Figure 63 [copy to follow]

Cave East VI(a)

Location: Caves East VI are situated at the east end of the series of caves on the eastern side of the Great Cliff in Bamiyan. Of the four caves that comprise Caves East VI, only Cave East VI(a) has a centred plan. Cave East VI(b), the forecourt, is south of Cave East VI(a), and Cave East VI(e), with a rectangular plan, is at the east end of these caves. Between Cave East VI(a) and Cave East VI(e) is Cave East VI(d), to which Cave East VI(c) is attached as a front room. The remaining vaulted curve, wall soil with tempers and black soot partially indicate that some caves may have been located on the western cliff of Cave East VI(a), although the cliff is now severely deteriorated.

Form: Square plan; domed ceiling; tambour; squinch. The square is about 3.6 m on a side. The squinch has fivefold arches and a shallowly carved tambour. To the south of the entrance is Cave East VI(b), essentially the cave's forecourt, and an engraved ledge sits on the upper part of the northern side of this cave.

Technique and design: The wall surface is crude and the squinch is shallowly engraved and geometrically inaccurate. A pilaster is carved into the centre of the east–west tambour. A similar shape has also been documented on the southern part of the dome in Cave XIV(b). The ledge wall on the northern side of the forecourt, Cave East VI(b), is elaborately chiselled; the traces of this chisel are more homogeneous than those of the cave's inner rooms.

Present condition: It seems that many changes were made to the cave in a later period. The floor of the cave is lower than that of the forecourt and the walls have several holes, which are irregular in size. On the lower part of the eastern wall, there is a small space, which could have been used for storage. The interior walls and ceiling are covered with black soot, except for the lowermost part of the side wall, which has presumably been exposed by recent digging. A part of the top layer of clay wall remains on the ceiling. The area around the cave's entrance is severely damaged.

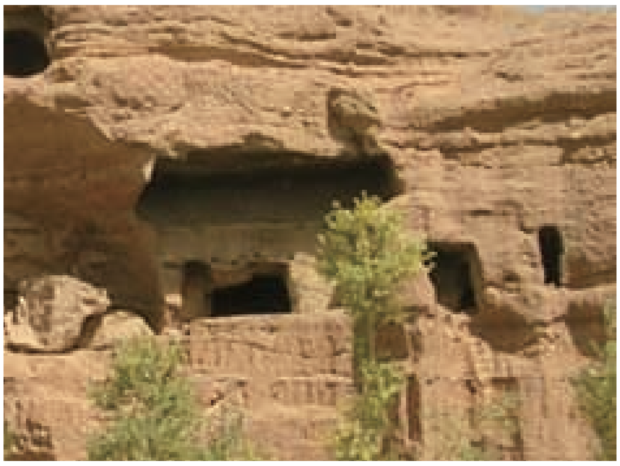


Figure 64 Caves East VI: façade.

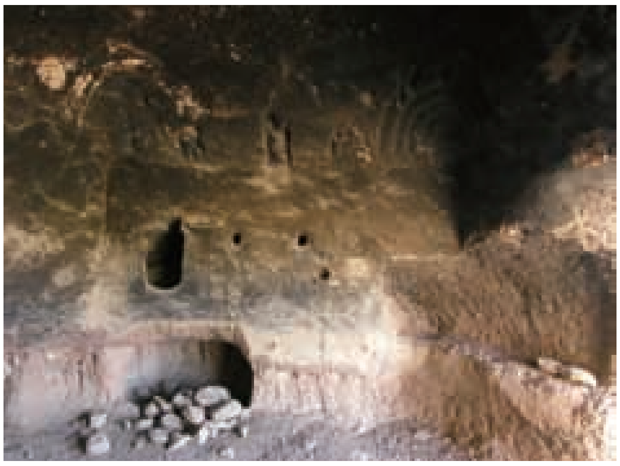


Figure 65 Cave East VI(a): eastern side.

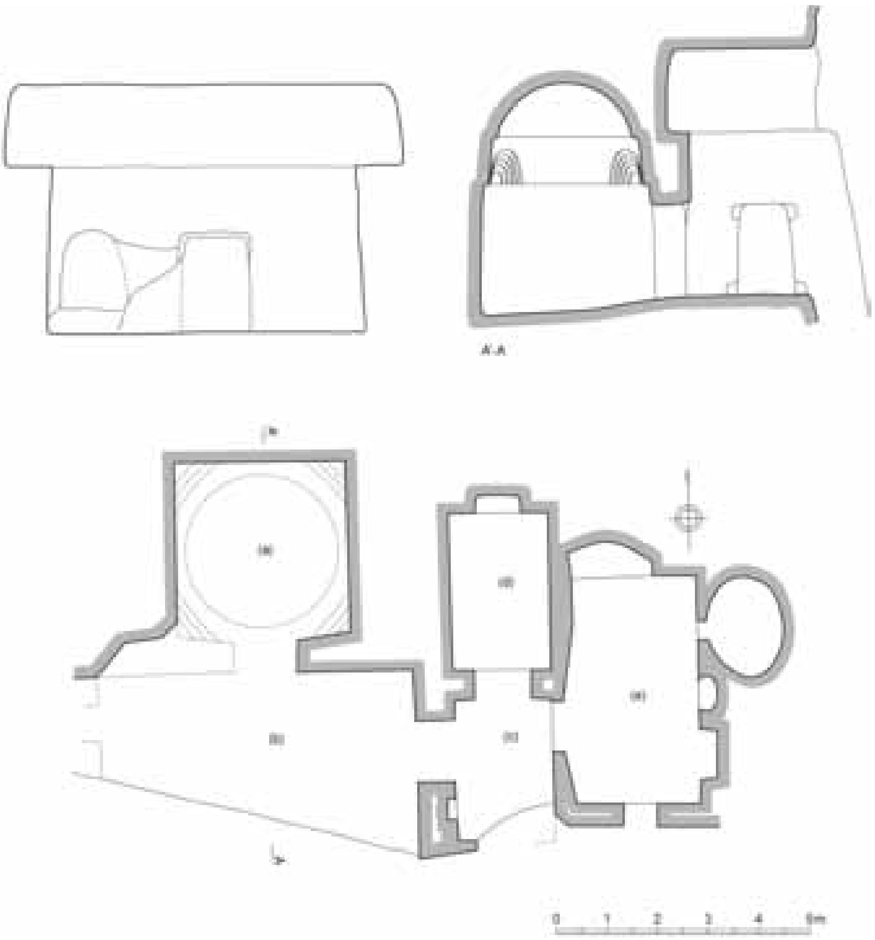


Figure 66 Caves East VI: plan; elevation of the forecourt. Cave East VI(a): section (after Kodera *et al*. 1971).

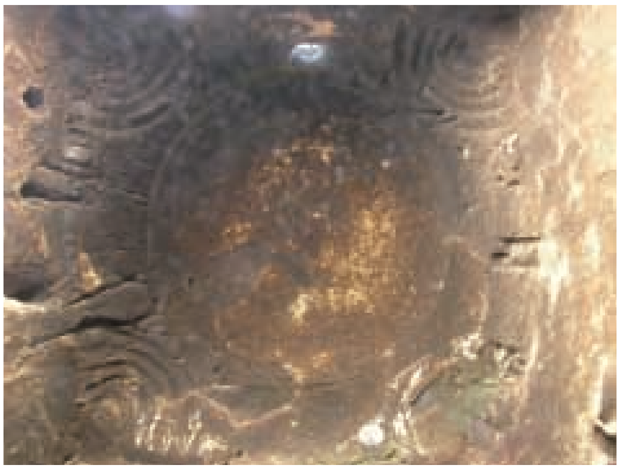


Figure 67 Cave East VI(a): ceiling.

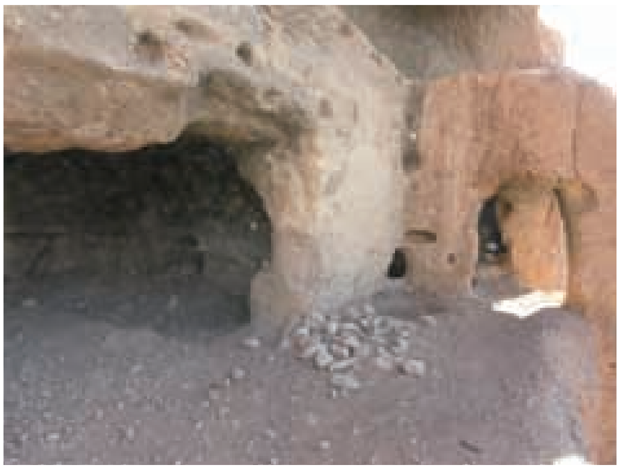


Figure 68 Cave East VI(b): cave as a forecourt.

Caves East V

Location: Caves East V are situated above and to the west of Caves East VI, near the east end of the Great Cliff in Bamiyan. Caves East V consist of four caves with rectangular and square plans.

Form: Aligned from east to west are Cave East V(c), Cave East V(a), Cave East V(d) and Cave East V(e). While Caves East V(c), V(d) and V(e) all have a rectangular plan, Cave V(a) has a square plan with a domed ceiling. Caves East V(a), V(c) and V(d) share Cave East V(b) as a forecourt.

Present condition: It is difficult to access the caves because the forecourt and step corridor on the southern part of the cliff were ruined. The black soot inside the caves indicates that they were once used as a residence. In addition, some later changes have been confirmed, including the addition of several holes in the walls and floors.

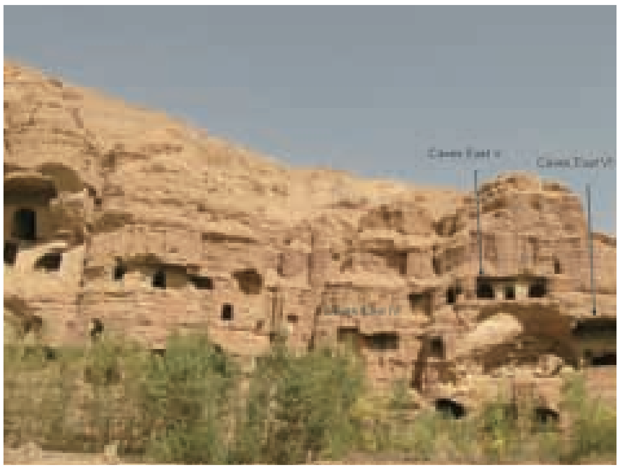


Figure 69 Caves East V: façade.

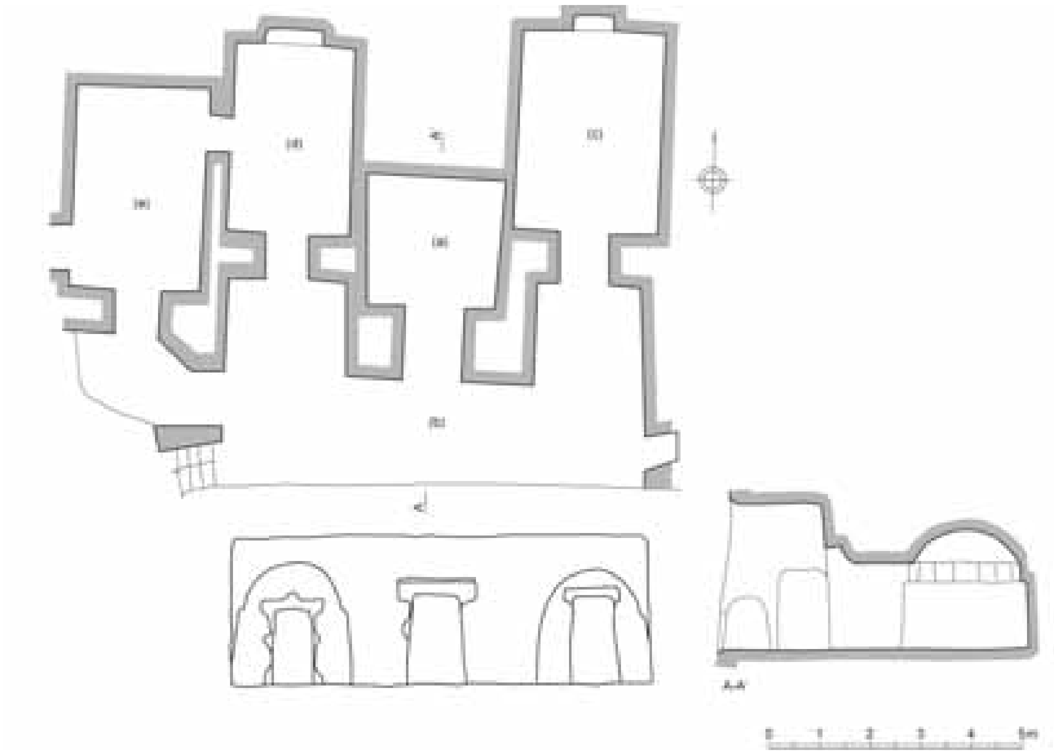


Figure 70 Caves East V: plan; elevation of the forecourt. Cave East V(a): section (after Kodera *et al*. 1971).

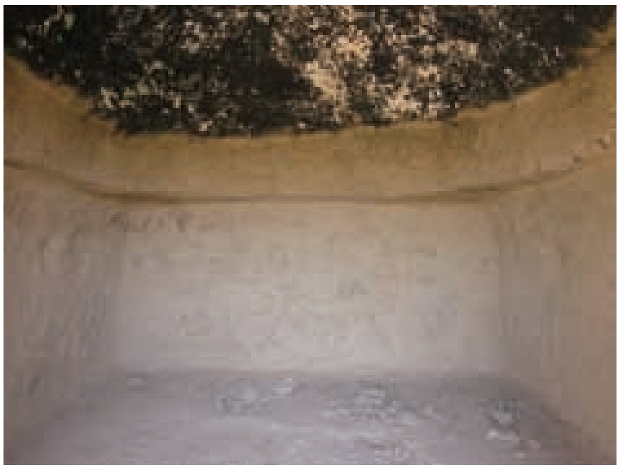


Figure 71 Cave East V(a): northern side.

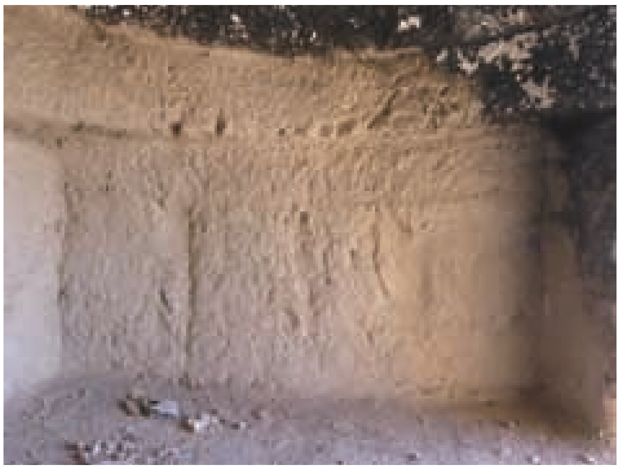


Figure 72 Cave East V(a): eastern side.

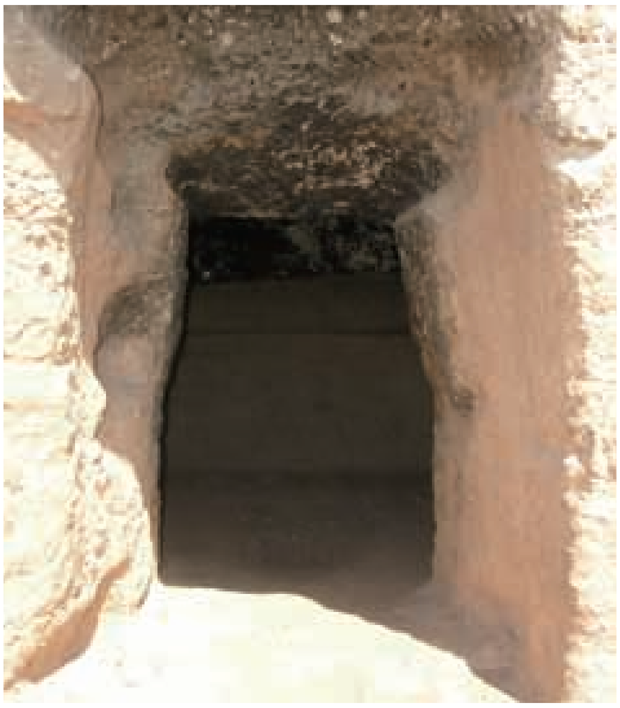


Figure 73 Cave East V(a): entrance.

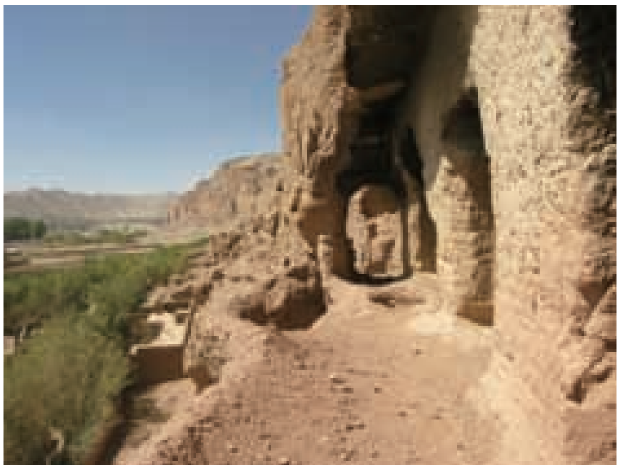


Figure 74 Cave East V(b): cave as a forecourt; western side.

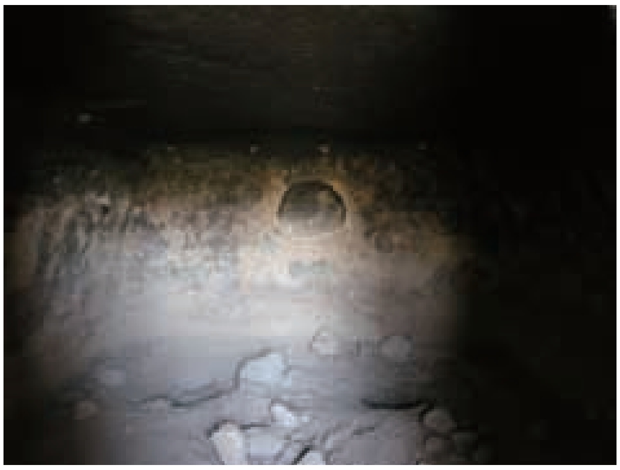


Figure 75 Cave East V(c): northern side.

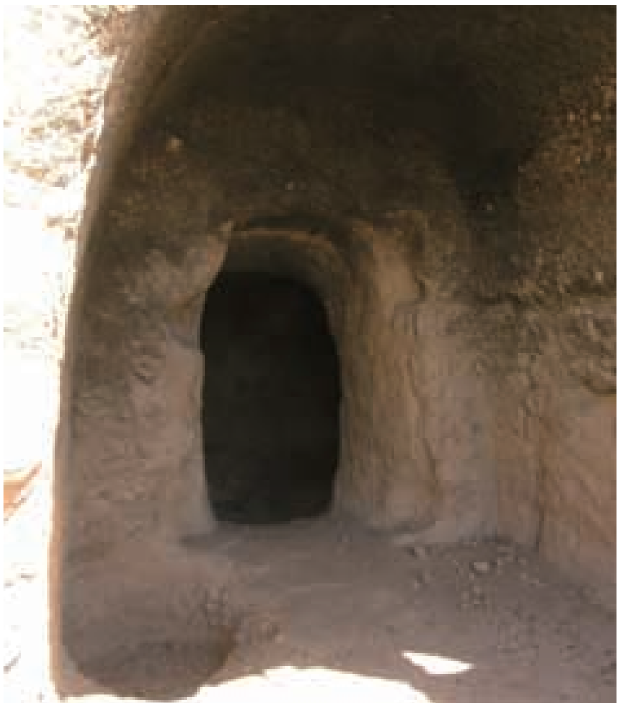


Figure 76 Cave East V(c): entrance.

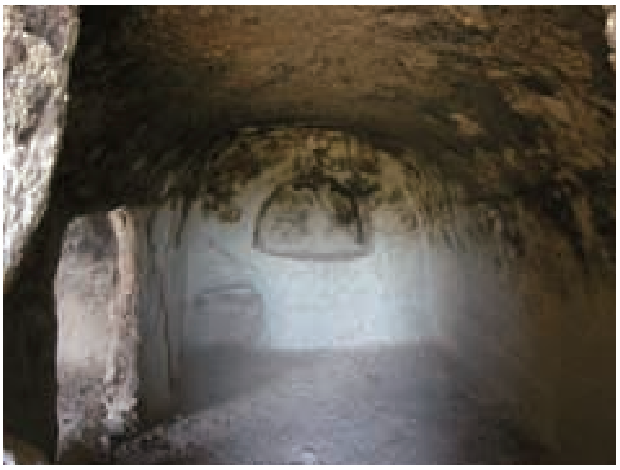


Figure 77 Cave East V(d): northern side.

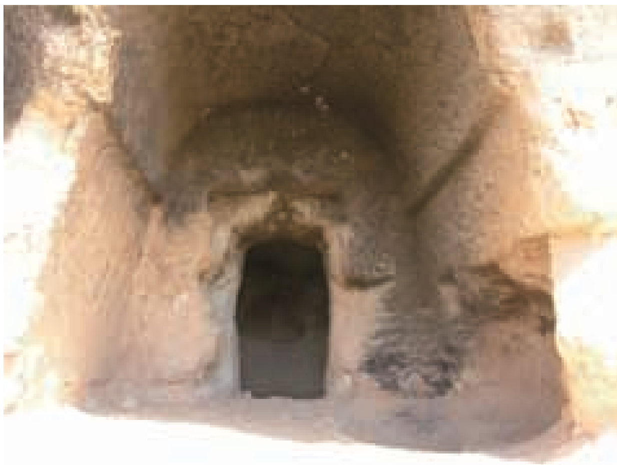


Figure 78 Cave East V(d): entrance.

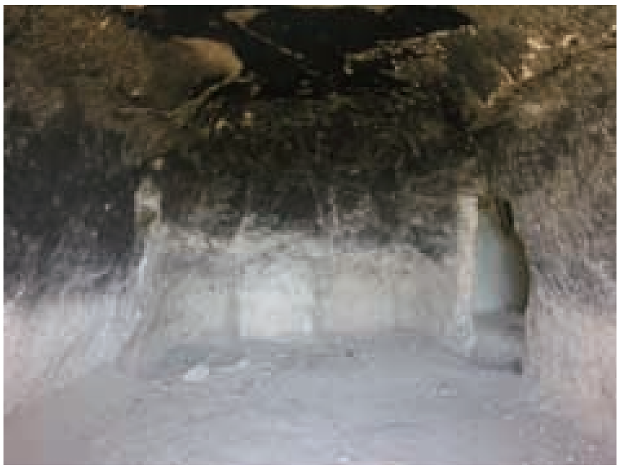


Figure 79 Cave East V(e): northern side.

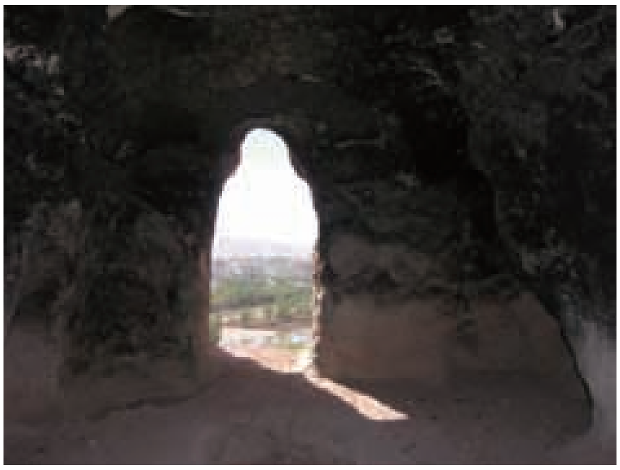


Figure 80 Cave East V(e): southern side.

Cave East IV(a)

Location: Caves East IV are situated to the west of Caves East VI, near the east end of the Great Cliff in Bamiyan. This cluster consists of two caves: Cave East IV(a) with the centred plan and Cave East IV(b) with the oblong plan.
Form: Octagonal plan; domed ceiling; tambour; first and second cornices. The plan is a fairly distorted octagon. Each part above the first cornice is specifically defined.
Technique and design: Both side walls and the tambour are inclined. The walls are made of clay. The tambour is hexadecagonal, twice the size of the octagonal plan, and the corners are distinctly decorated. While the cornice retains some traces of mural painting, there are no mortises or remnants of three-dimensional decorations created by modelling. The ceiling is a shallow dome on which the Thousand Buddhas have been painted concentrically and is still visible through the black soot on the surface. The stupa is located at a specific point on the extended axis of the caves (Fig. 87). It is plausible that the caves were originally designed to face the stupa.
Present condition: The cave has black soot on the walls and the ceiling, and there is a strong tarry odour. On the side walls are many shelf-shaped holes that were possibly created in a later period. Among these, the hole at the centre of the western wall still allows a trace of inflowing water (Fig. 84). This hole is currently sealed with mud bricks for conservation. The cliff to the west of Cave East IV(a) has a large crack through which water has probably permeated. The entrance is temporarily closed with mud bricks and a wooden door in order to protect the mural paintings on the walls.

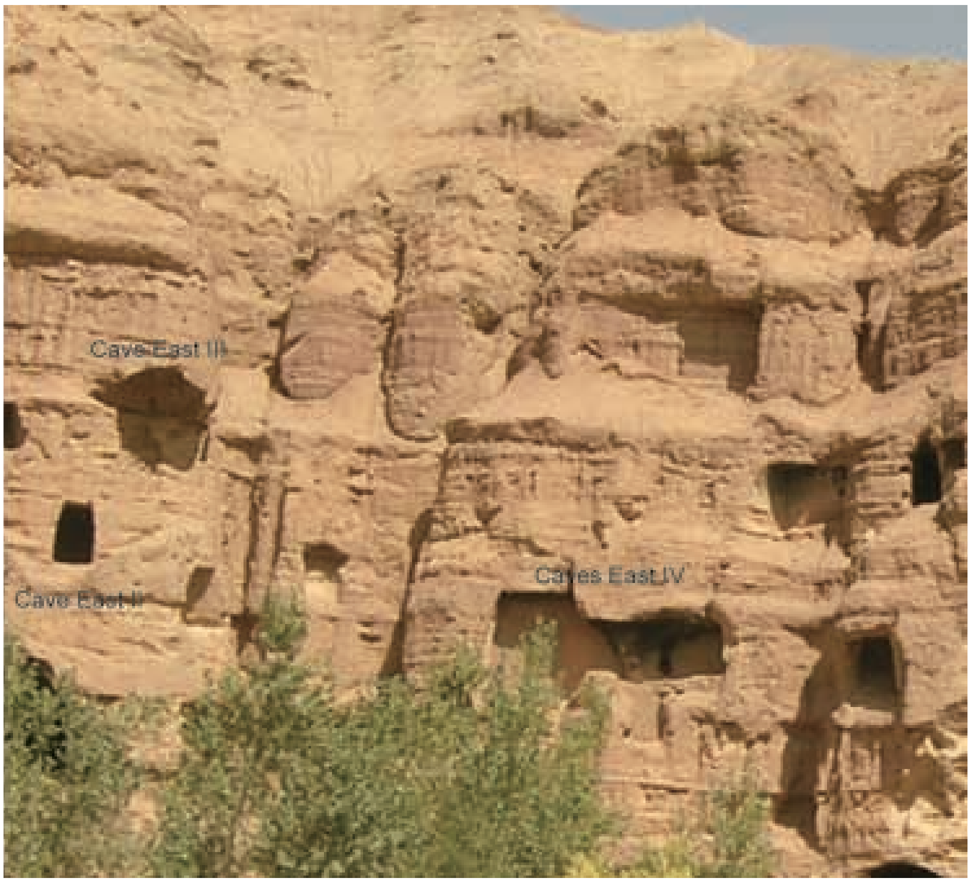


Figure 81 Caves East IV: façade.

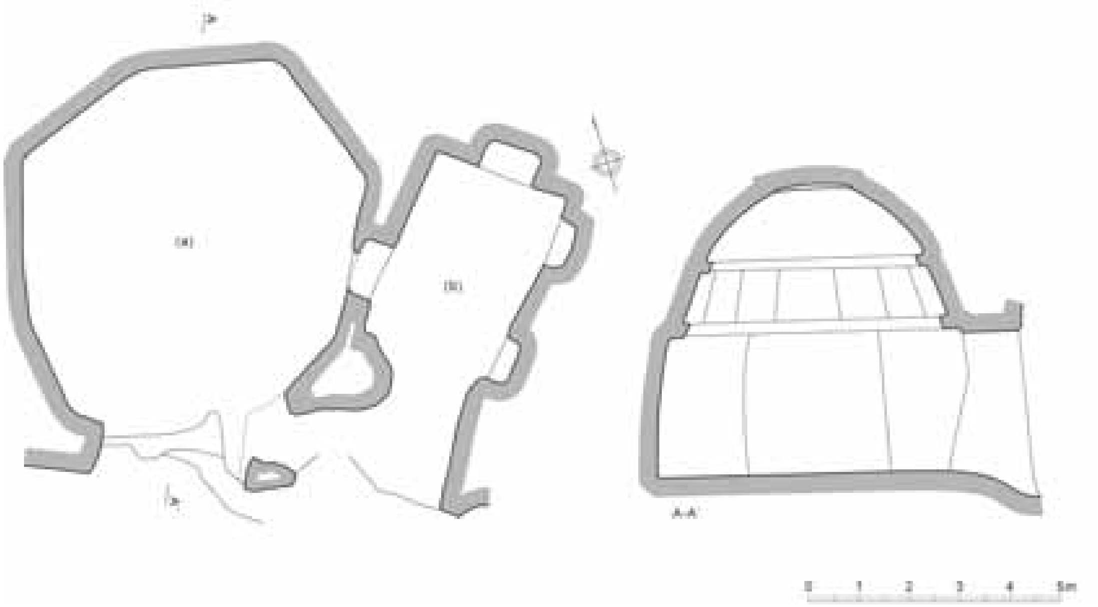


Figure 82 Caves East IV: plan. Cave East IV(a): section (after Kodera *et al*. 1971).

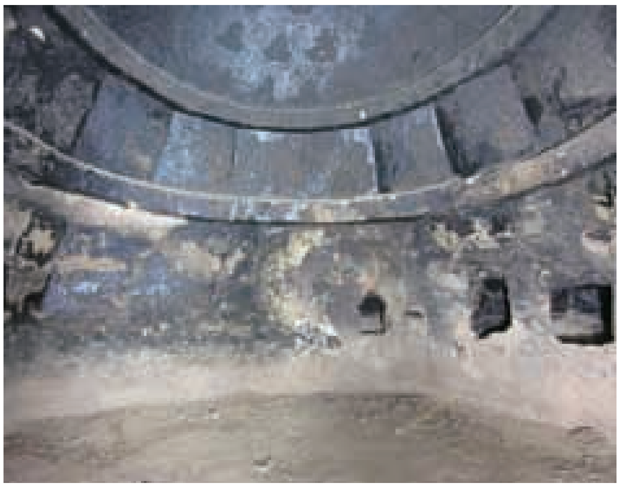


Figure 83 Cave East IV(a): northern side.

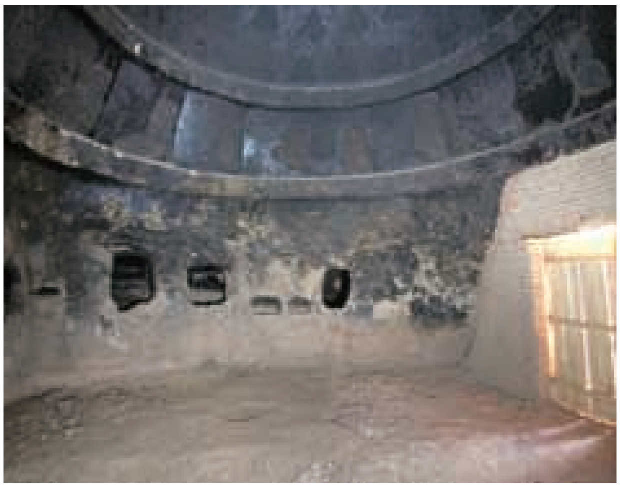


Figure 85 Cave East IV(a): eastern side.

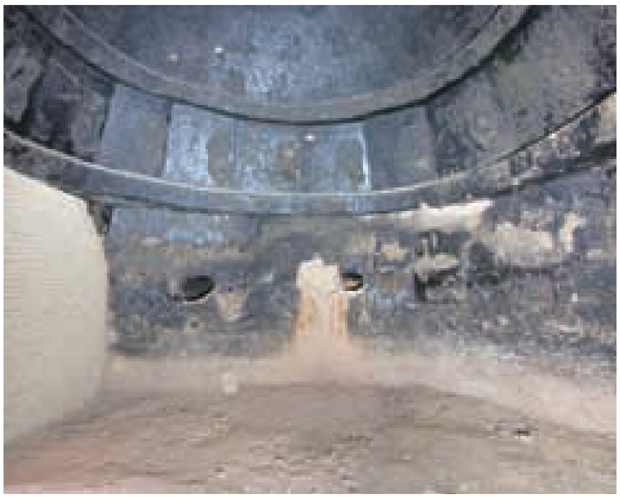


Figure 84 Cave East IV(a): western side.

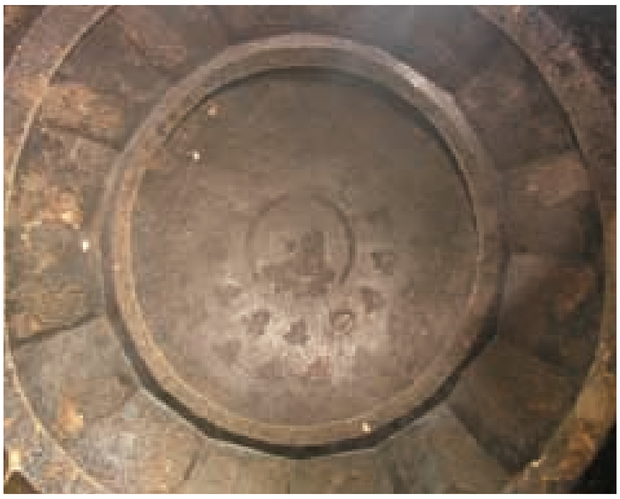


Figure 86 Cave East IV(a): ceiling.

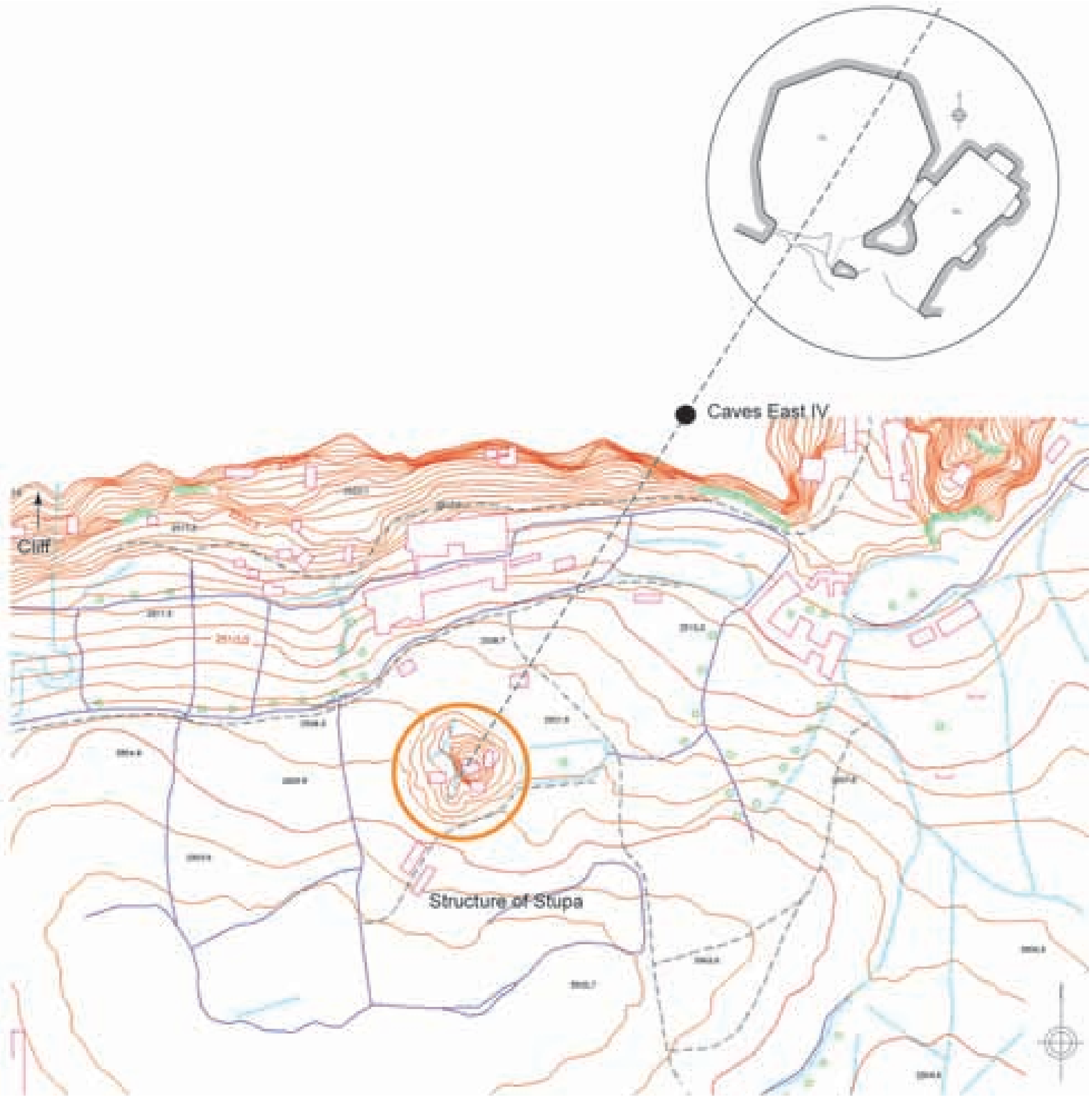


Figure 87 Plan: Caves East IV and the stupa (measured by PASCO Corporation, Japan, in 2003).

Cave East III

Location: Cave East III nestles along the eastern side of the Great Cliff in Bamiyan.
Form: Square plan; domed ceiling; cornice. The cave is 3.5–3.7 m square. A round cornice is simply formed at the transitional section between the wall and dome.
Technique and design: It is assumed that standing statues were placed on the northern and western walls, based on the fact that large mortises are systematically aligned on the upper and middle parts of these walls. The location of these mortises corresponds to the traces of a halo that remain on the northern wall. The wall clay is layered, which indicates that the layers may have been constructed gradually over different periods. Based on the layout of the mural paintings, the alignment of mortises, and the layer pattern of the wall clay, a small niche at the centre of the northern wall may well have been created later than the current mural painting. On the face of the cornice there is still a slight trace of the three-dimensional decoration created by modelling (Fig. 93). There is a trace of a ripped mural painting on the ceiling, which possibly indicates that an image of the Goddess of Kannon surrounded by the Thousand Buddhas may have been portrayed there (Fig. 92).

Present condition: The southeast part of Cave East III has already collapsed, causing the cave to be half-damaged and exposed to the air. It is therefore highly dangerous to approach the cave. Some structural cracks run vertically on the western wall of the cave (Fig. 91). On the floor is a hole, probably bored in a later period. There is also a trace of a bird's nest on the ceiling.

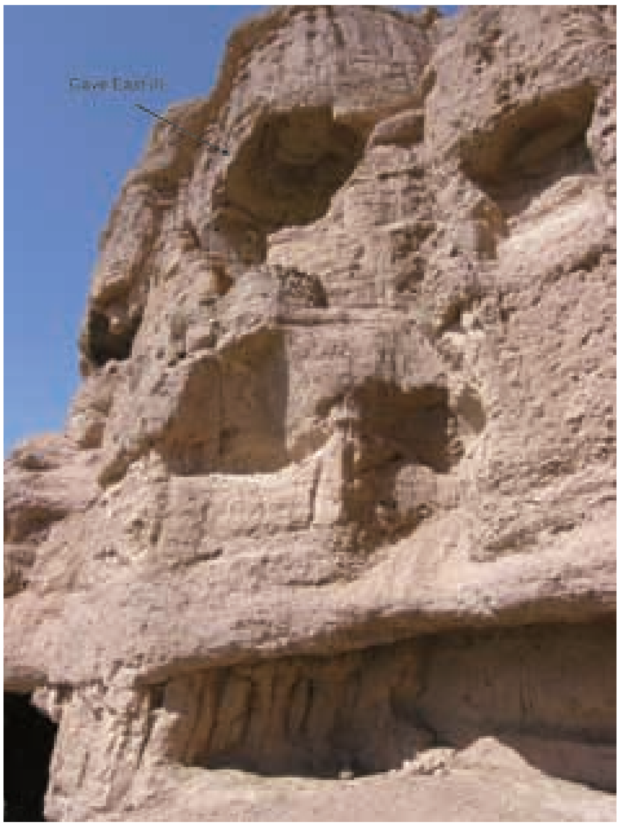


Figure 88 Cave East III: façade.

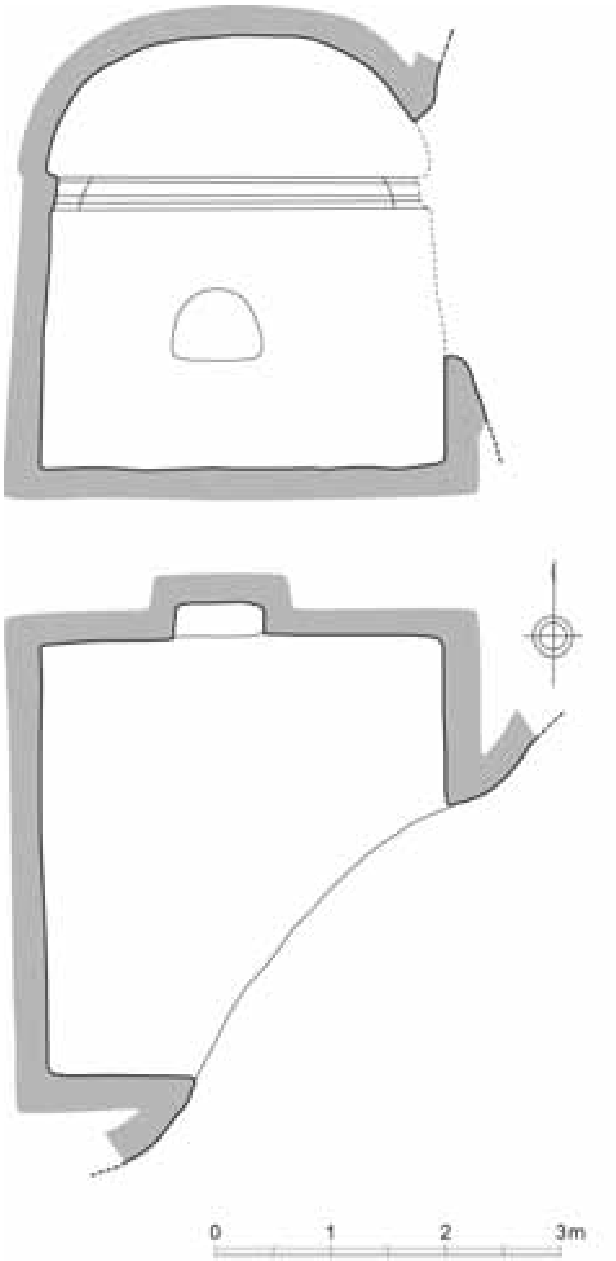


Figure 89 Cave East III: plan; section (after Kodera *et al*. 1971)

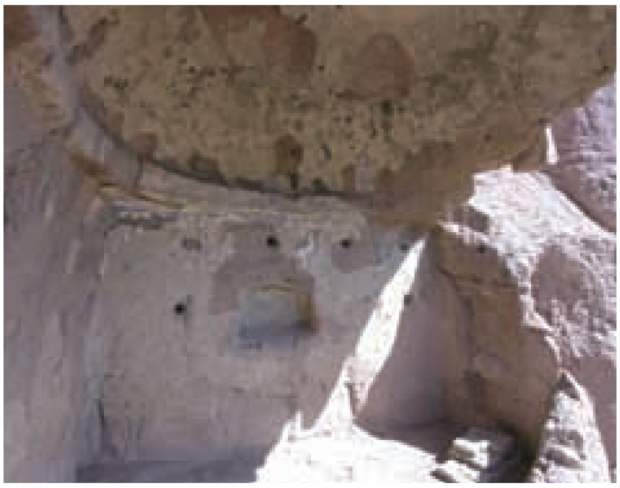


Figure 90 Cave East III: northern side.

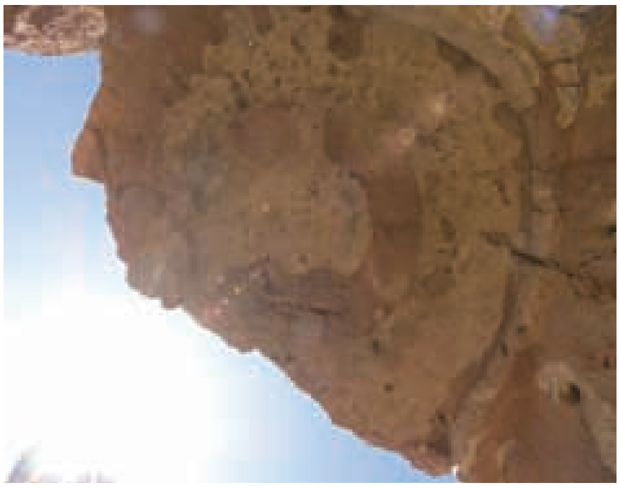


Figure 92 Cave East III: ceiling.

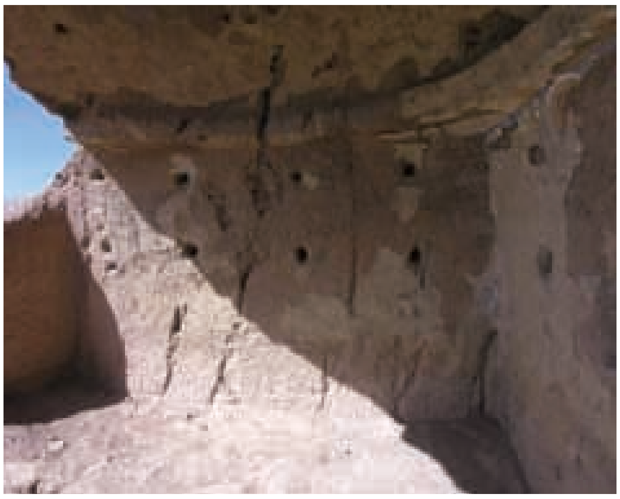


Figure 91 Cave East III: western side.

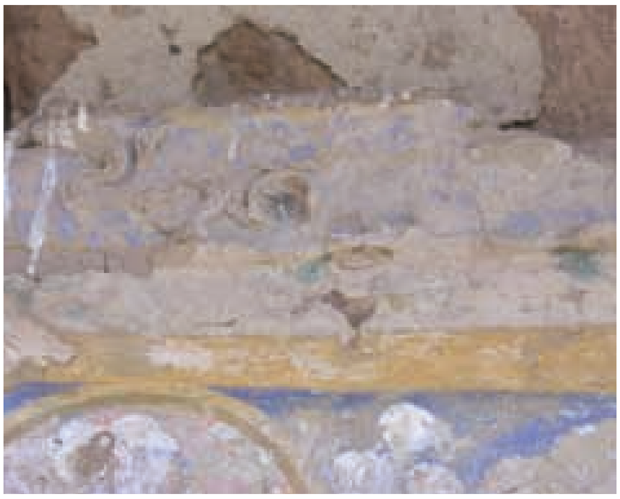


Figure 93 Cave East III: modelling decoration on the cornice (northern side).

Cave East II

Location: Cave East II is situated along the eastern side of the Great Cliff in Bamiyan. This is a small cave under Cave East III.

Form: Octagonal plan; domed ceiling; tambour; first and second cornices. The first round cornice, tambour, and the second cornice were built in that order, and the domed ceiling was built over these. The side walls are slightly inclined. The shapes of the plan and the dome are not geometrically accurate.

Technique and design: The small cave, Cave East II, stands alone. Each part is distinctly engraved and elaborately finished. While the wall clay remains in poor condition on the side walls, causing the bedrock with rough carving to be exposed, the section above the first cornice is in

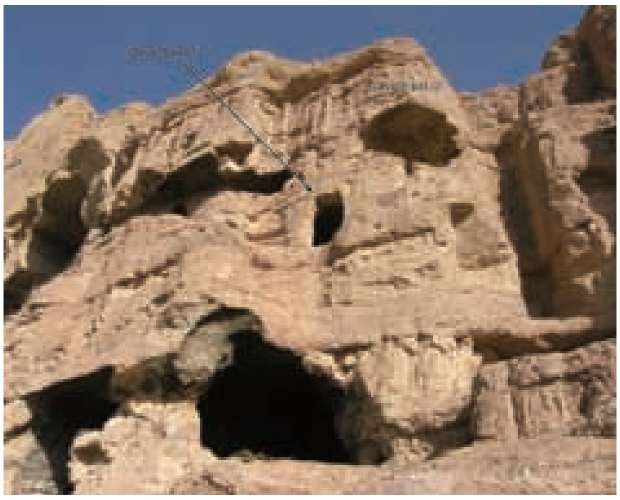


Figure 94 Cave East II: façade.

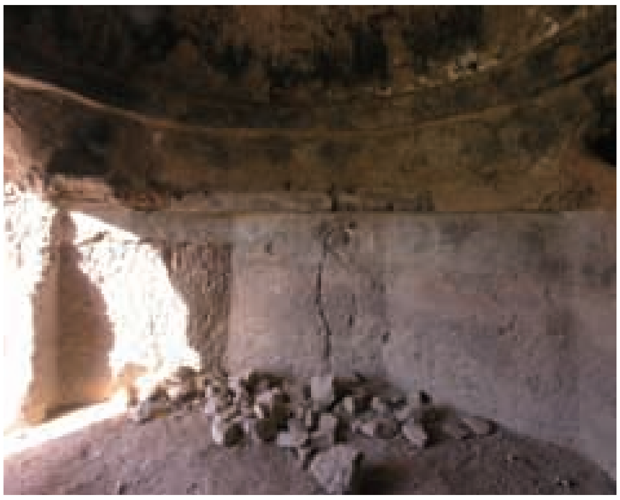


Figure 95 Cave East II: western side.

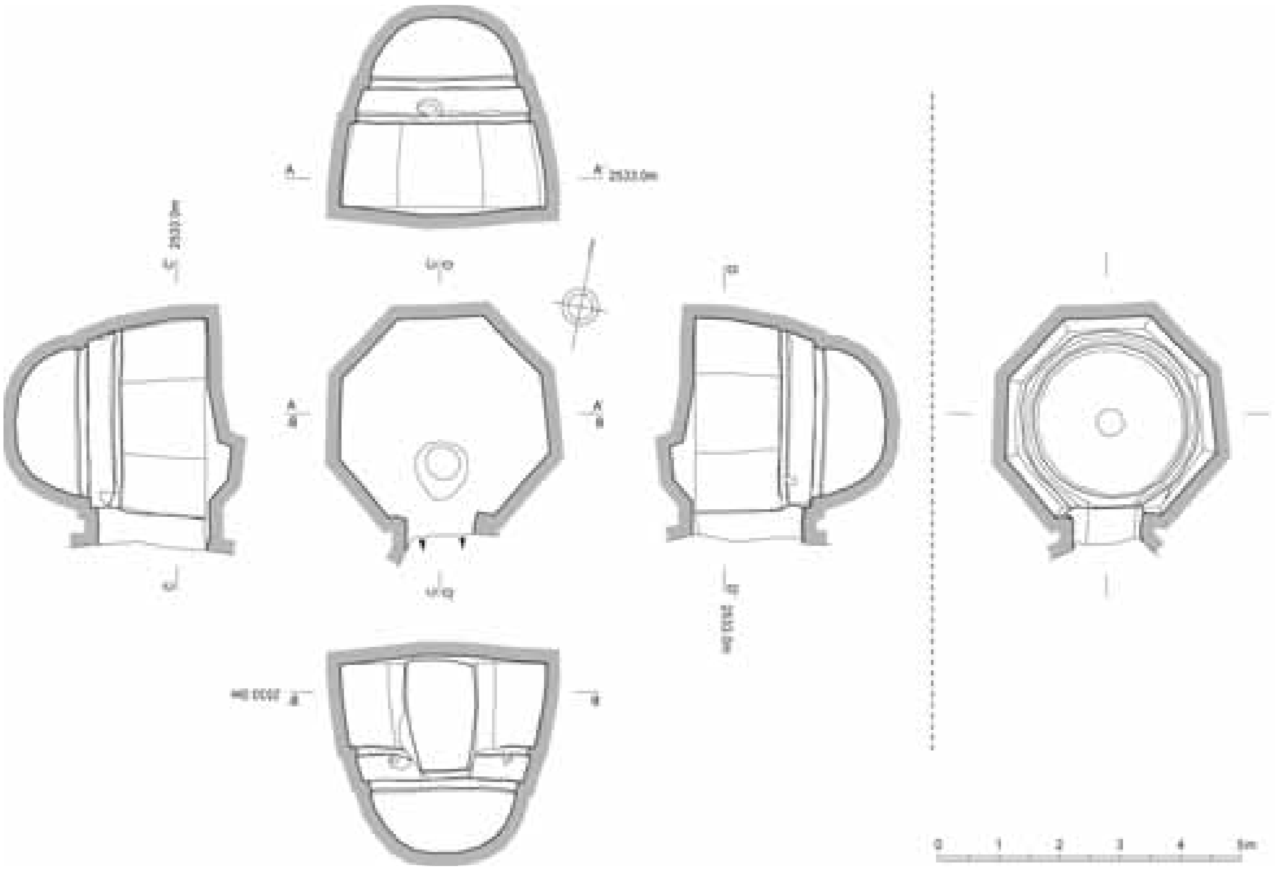


Figure 96 Cave East II: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

relatively good condition. From the fact that four layers can be seen by megascopic observation, it seems that the wall clay may have been repeatedly recoated. It is assumed that a bench-style pedestal could have been attached to the side walls based on the trace of a certain horizontal structure about 30 cm above the current floor. There are some indications that the cave may have been used as a residence, however, black soot is not in evidence unlike other caves presumed to be used for human habitation. There are three square holes obliquely aligned on the lower right-hand side of this cave, possibly remnants of a wooden structure, such as a corridor, constructed near Cave East II.

Present condition: The southern side of the cliff has collapsed and no indications of any corridor to access the cave are confirmed. There are many small cracks observed inside the cave – a large one on the ceiling runs east–west (Fig. 98). On the western side wall is an 8 mm-wide crack (Fig. 95). A long crack from the ceiling to the floor is found on the eastern side (Fig. 97). At the southern part of the floor is a hole, presumably pitted in a later period.

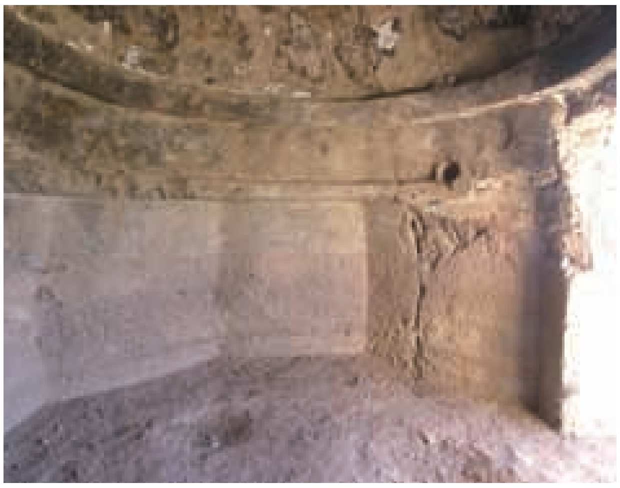


Figure 97 Cave East II: eastern side.

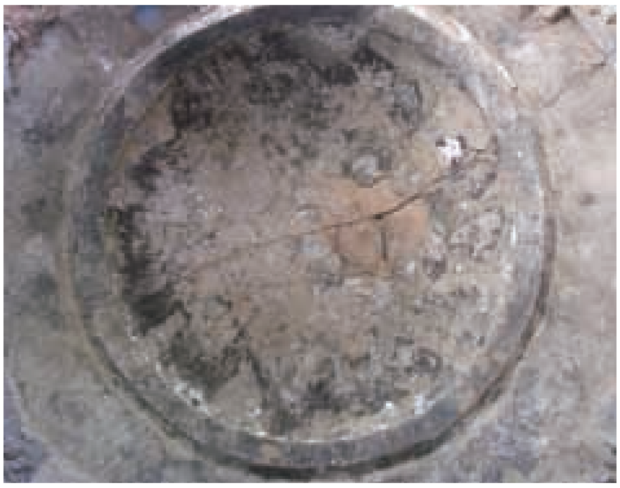


Figure 98 Cave East II: ceiling.

Cave East I(a)

Location: Caves East I are located to the west of Cave East III and to the east of Cave U, which are on the eastern side of the Great Cliff in Bamiyan. This cluster consists of Cave East I(a), with the centred plan, and Cave East I(b) and Cave East I(c), both of which feature the oblong plan. These three caves share a forecourt on the southern side to which each has a distinct entrance. Cave East I(a) and Cave East I(b) are connected by an inner entrance, which has clearly been added in a later period judging from the fact that it is not related to the design of the cave. The current side walls were probably coated in a later period as the cave has very little black soot on the walls and the mural paintings are partially exposed on the western side wall (Fig. 108).

Form: Octagonal plan; *laternen-decke*; polygonal tambour. Cave East I(a) stands between Cave East I(b) and Cave East I(c), and all three share the forecourt. The tambour is usually used as a transitional piece between the wall and domed ceiling; however, here a *laternen-decke* is employed. Each side wall has an individual niche and the tambour has three corbels.

Technique and design: The *laternen-decke* is combined with three narrow and low-cut joists, the lowest of which is decorated with a V-shape joist outside of the centre part (Fig. 104). This arrangement is unique among *laternen-deckes* in Bamiyan. Mortises on the niches and the tambour indicate that a three-dimensional statue may have been installed. Between the conterminous niches, there are engraved pilasters. The niches convey the impression that they stand individually within a large space. A red-coloured layer has been observed under the soot gleaming black on the ceilings of three niches. The entrance – which characteristically takes the shape of a niche with a high top (Fig. 105) – suggests a doorframe both inside and out.

Present condition: Because of the collapse of the southern side of the forecourt, it is difficult to access the cave. There are many indications of changes added when the cave was used as a residence, including the black soot on the side walls and holes in the floor and side walls. The passage to Cave East I(b) was clearly constructed in a later period (Figs 103, 106). Cracks are confirmed on the northwest tambour and the ceiling in the cave (Figs 103, 104).

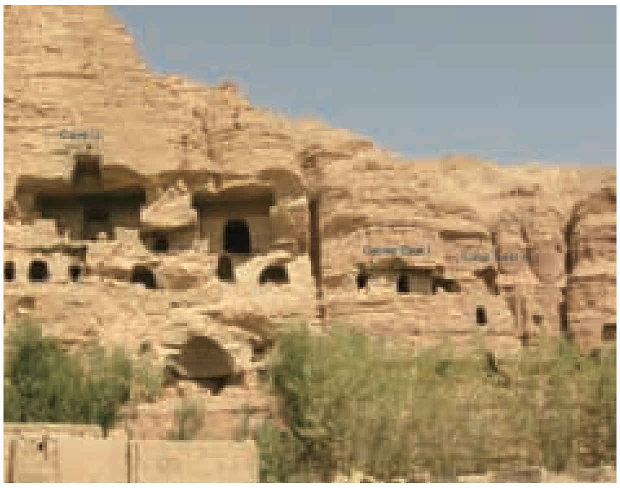


Figure 99 Cave East I(a): façade.

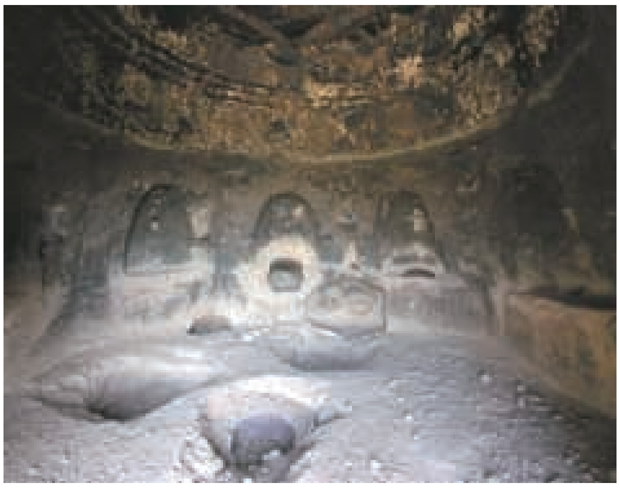


Figure 100 Cave East I(a): northern side.

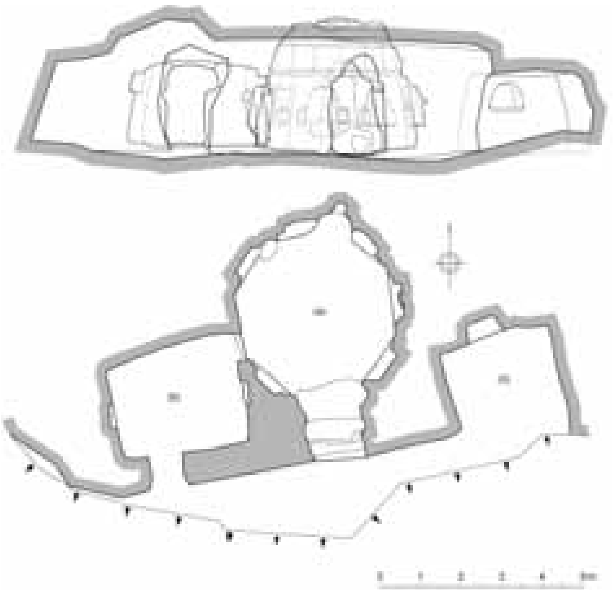


Figure 101 Cave East I(a): plan; elevation of the forecourt (measured by PASCO Corporation, Japan, in 2007).

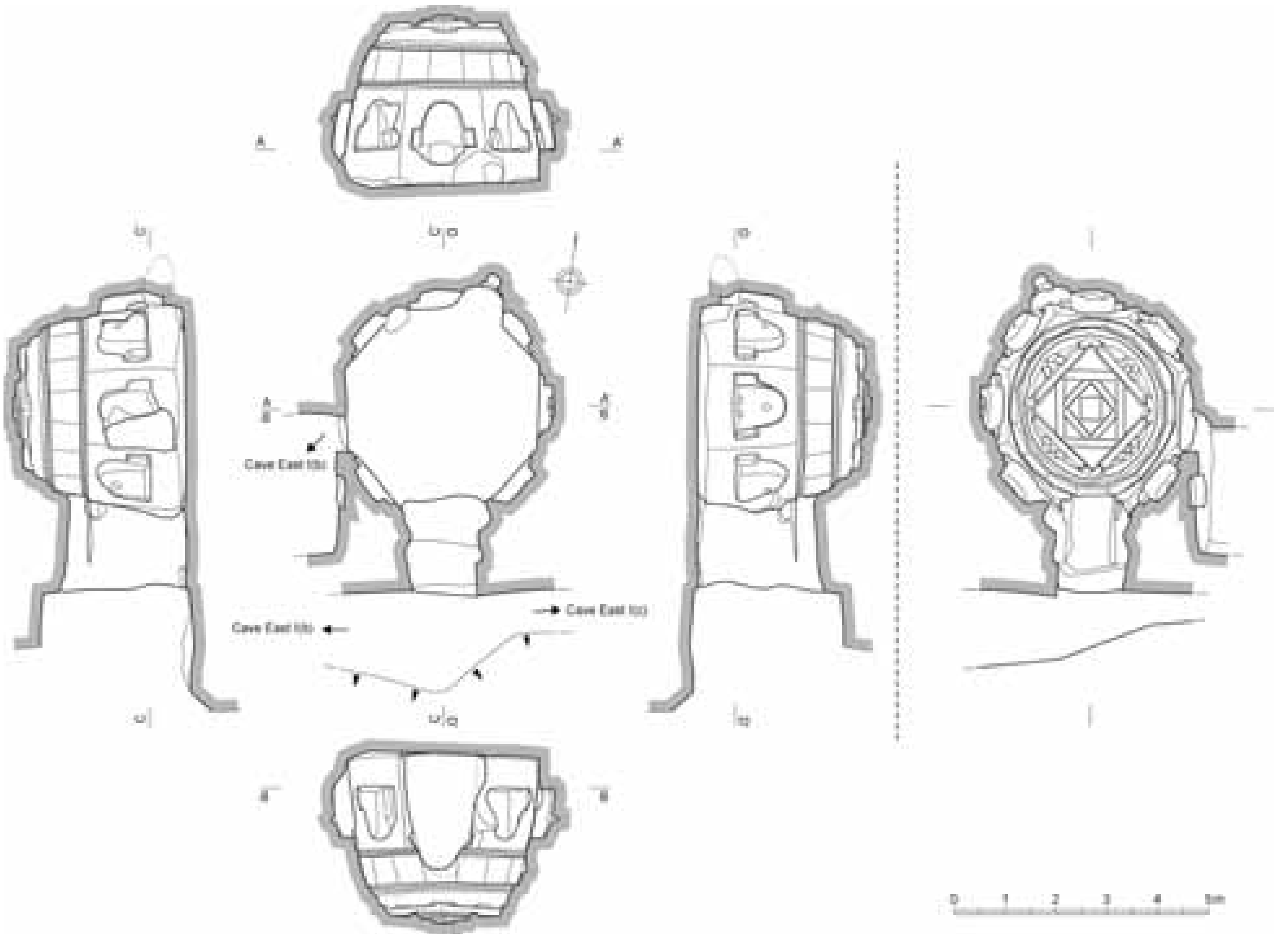


Figure 102 Cave East I(a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

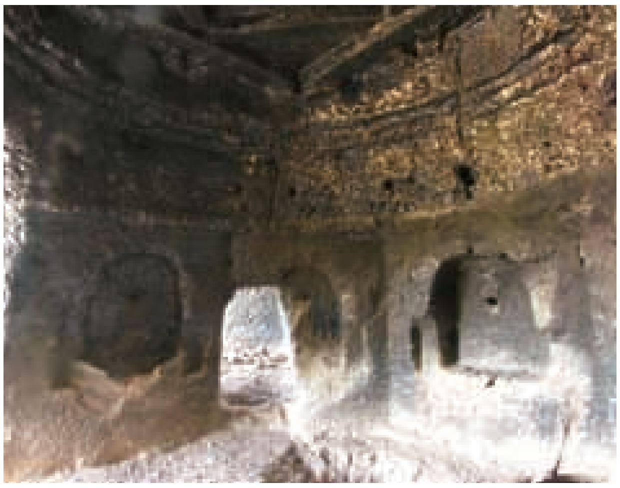


Figure 103 Cave East I(a): western side.

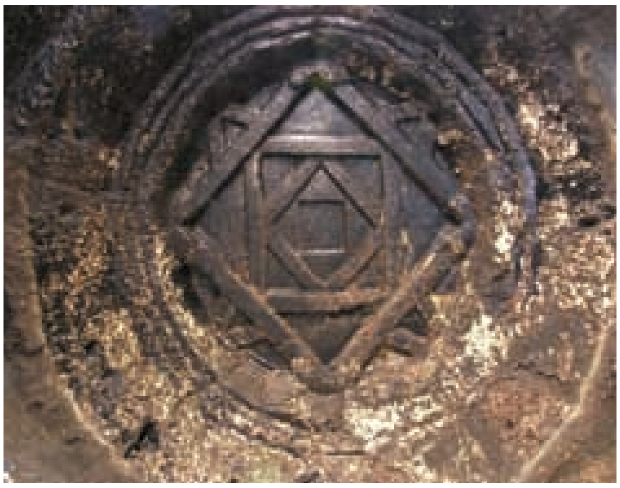


Figure 104 Cave East I(a): ceiling.

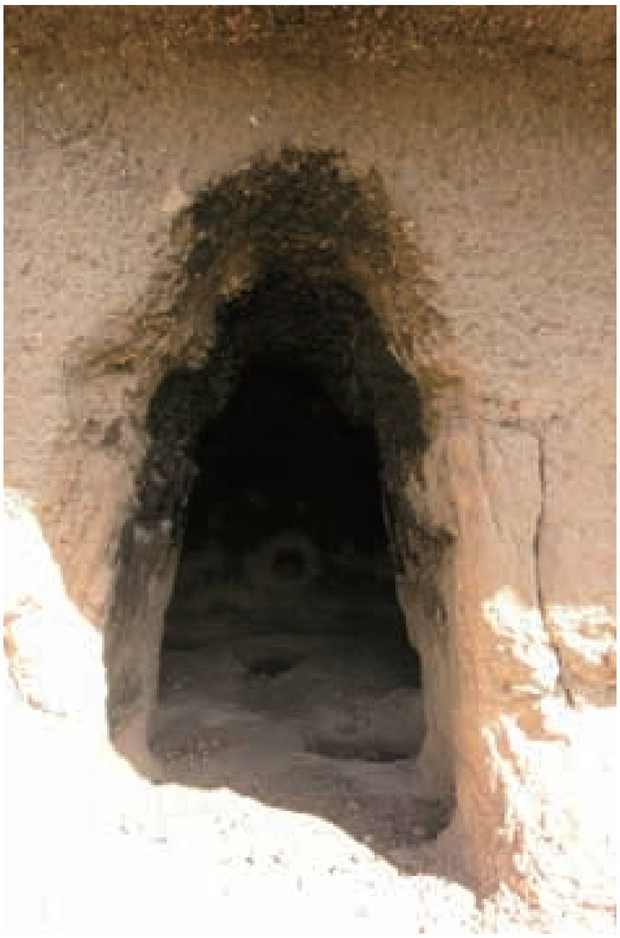


Figure 105 Cave East I(a): entrance.

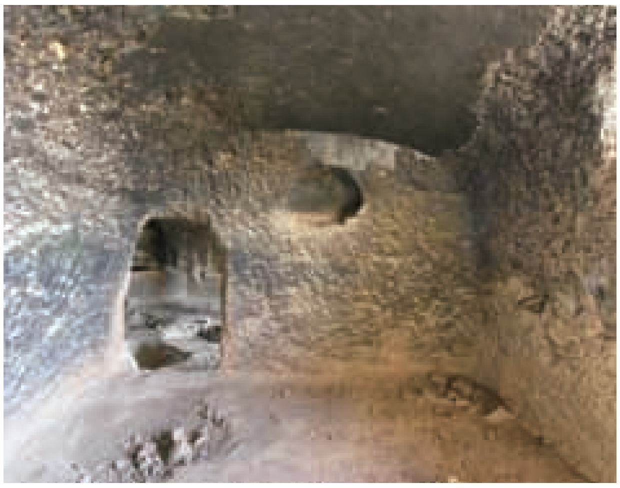


Figure 106 Cave East I(b): eastern side.

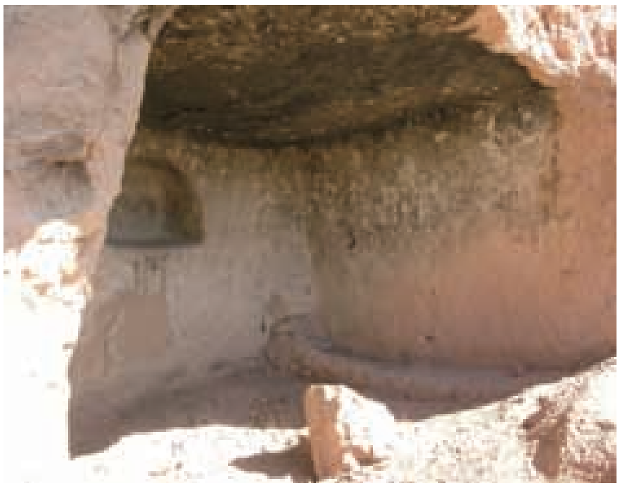


Figure 107 Cave East I(c): eastern side and northern side.

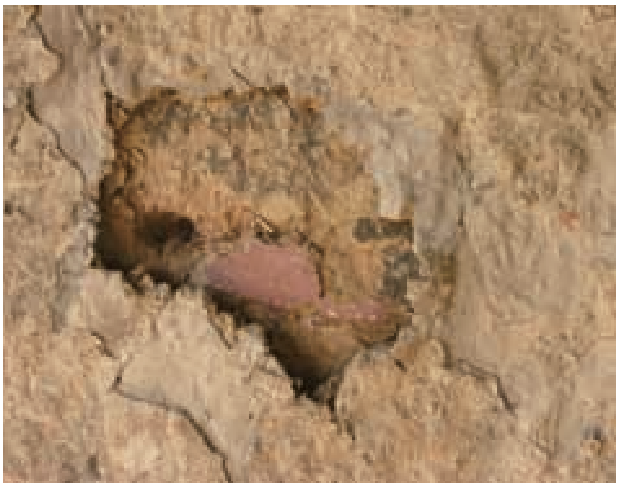


Figure 108 Cave East I(c): mural painting below the wall clay (western wall).

Cave U

Location: Cave U nestles along the eastern side of the Great Cliff in Bamiyan. The cave is situated to the west of Caves East I.

Form: Square plan; domed ceiling; polygonal tambour; first and second cornices. This cave, about 7.4 m on each side, is relatively large for the Bamiyan site. It has a square plan featuring a cornice with an octagonal shape, a tambour with an octagonal shape, and a second cornice with a hexadecagonal shape leading up to a domed ceiling.

Technique and design: Each wall has three niches and the bottom of each is about 65 cm above the floor. It is assumed that standing statues were installed in the niches based on the regularly aligned mortises in both small and large sizes. There is a base in the shape of a triangle

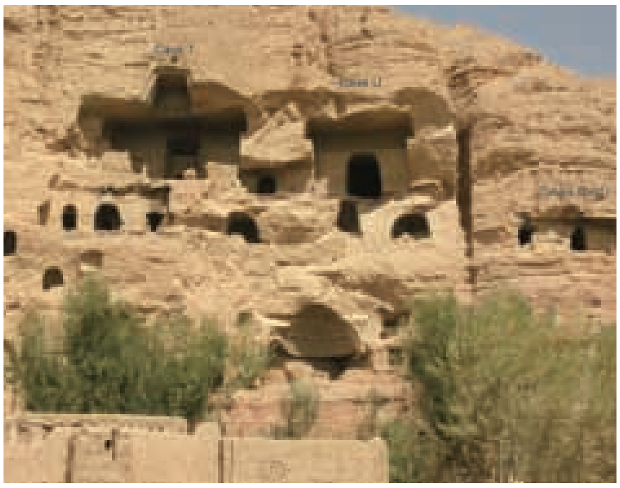


Figure 109 Cave U: façade.

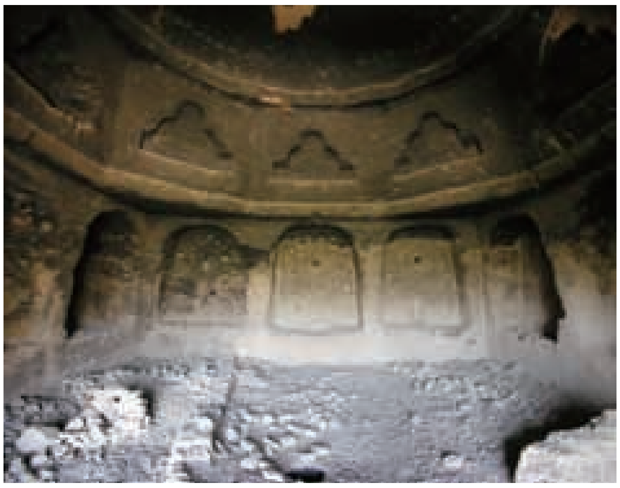


Figure 111 Cave U: northern side.

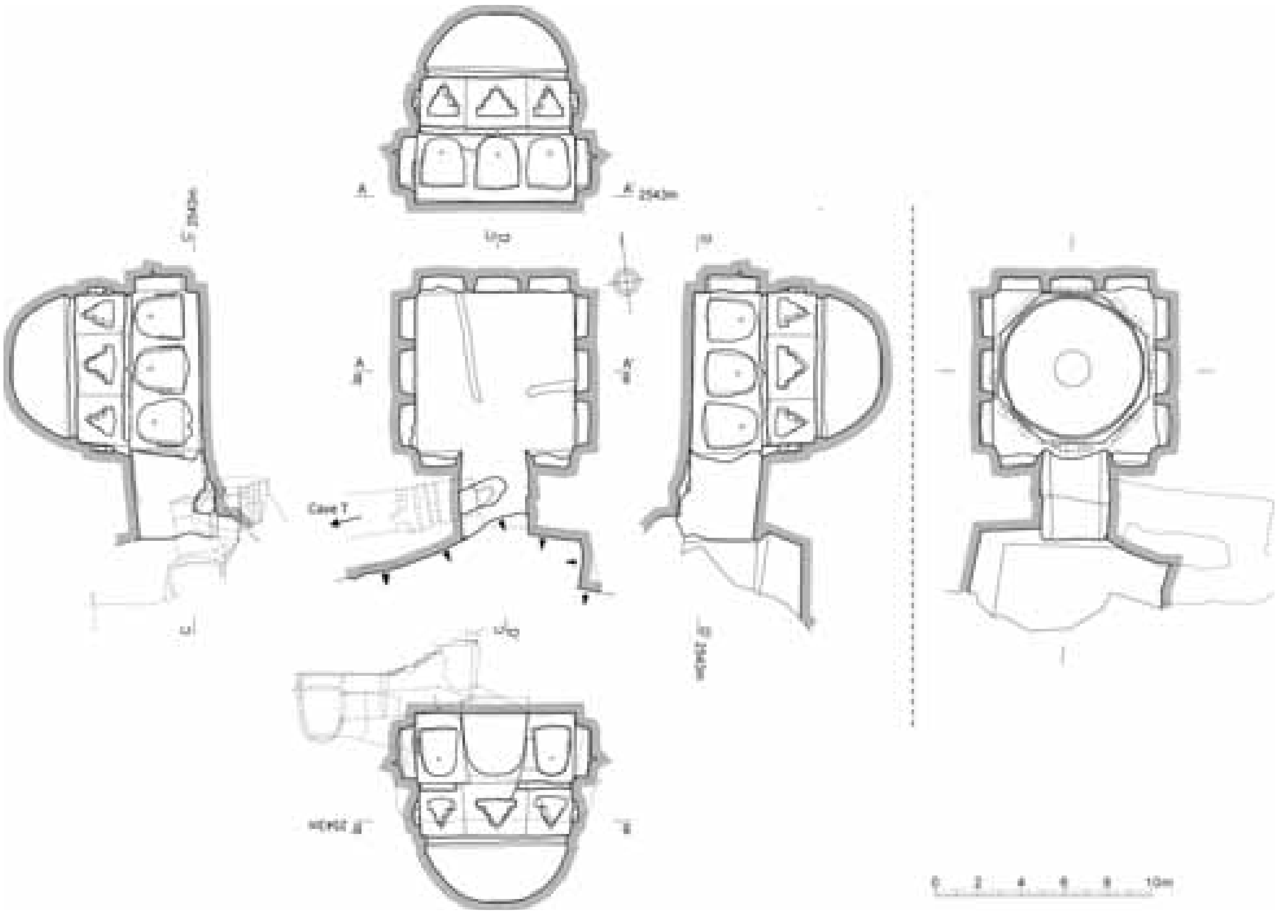


Figure 110 Cave U: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

remaining at each re-entrant angle of the side walls on the first cornice, producing an octagonal silhouette (Fig. 115). The face of the first cornice to the left and right of the entrance features a relief with an arabesque design. Each side of the octagon-shaped tambour has a niche with an independent trefoil. The niches are shallowly rimmed. It is presumed that some statues could have been installed inside these niches from the fact that several mortises still remain. The second cornice with a hexadecagonal shape partially retains three-dimensional decorations on its face (Fig. 116), and two-tiered lines have been confirmed below the cornice. Moreover, a moulding cornice (a horizontal decorative projection under a cornice) is rounded up in the corner between the bottom of cornice and the tambour (Fig. 117). The wooden tenons into which these fit still remain. It is rare in Bamiyan that the moulding decoration remains under the cornice.

The sub-base of the domed ceiling holds horizontal wooden tenons, which suggests that there could have

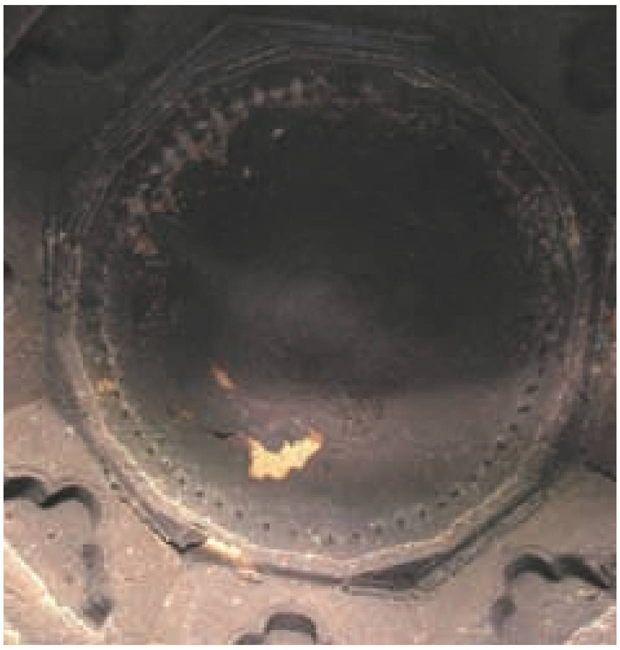


Figure 114 Cave U: ceiling.

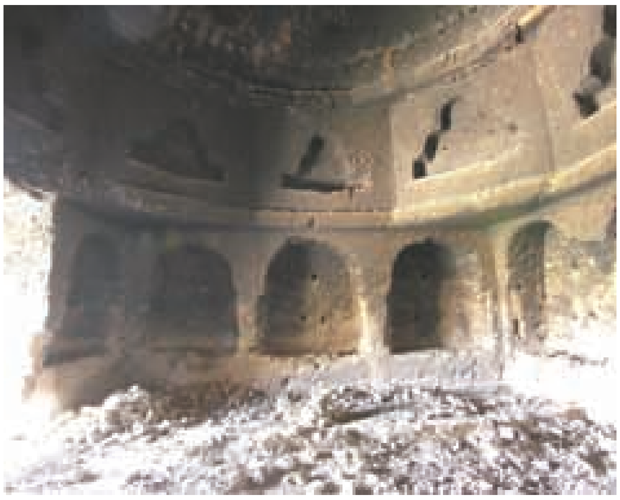


Figure 112 Cave U: western side.

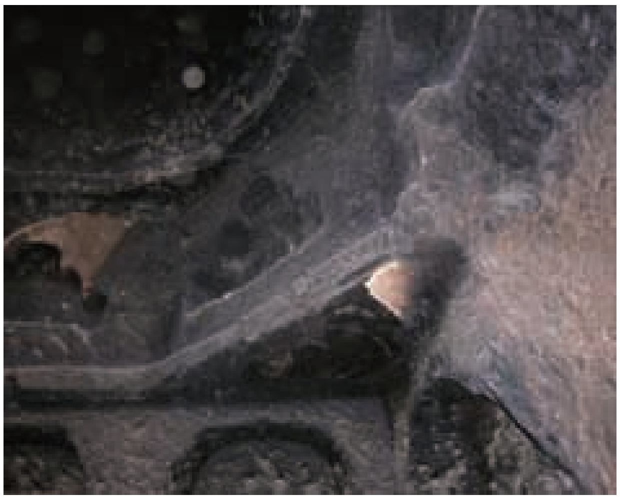


Figure 115 Cave U: re-entrant angle of the first cornice.

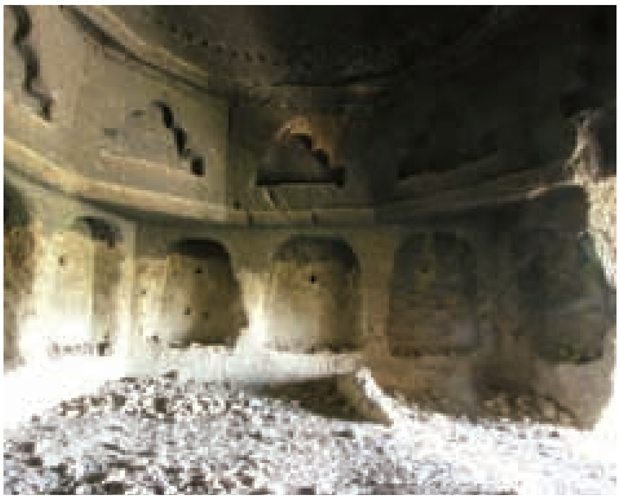


Figure 113 Cave U: eastern side.

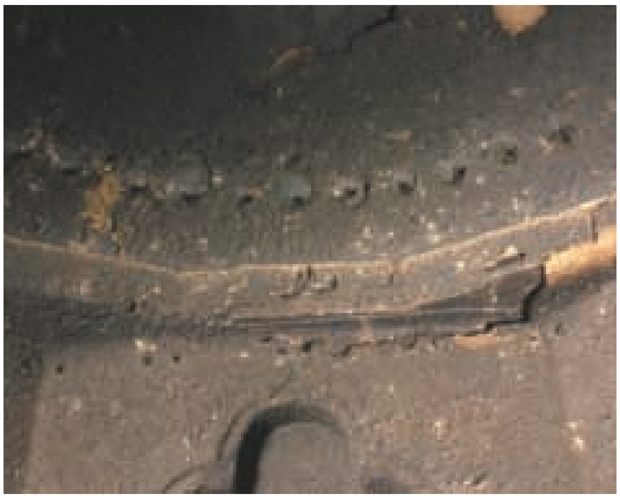


Figure 116 Cave U: second cornice with three-dimensional decorations.

been three-dimensional decorations here. The southern side of Cave U, namely the forecourt, has already been destroyed. The remnants of the floor indicate that the steps between Cave U and Cave T were originally used to access Cave U. One could have presumably ascended to the stairway's half-landing and then followed the connecting corridor. In this case, Cave T and Cave U, connected by the shared half-landing, form a cluster.

Present condition: Some more recent changes to the floor have been confirmed, including the addition of a partition. Black soot covers the thick side walls and the ceiling. The wall clay is partially fallen out in blocks. Some cracks run vertically or obliquely from the ceiling and the tambour to the side walls inside the cave. Furthermore, another crack runs in a vertical direction against the cliff at the top of the entrance.

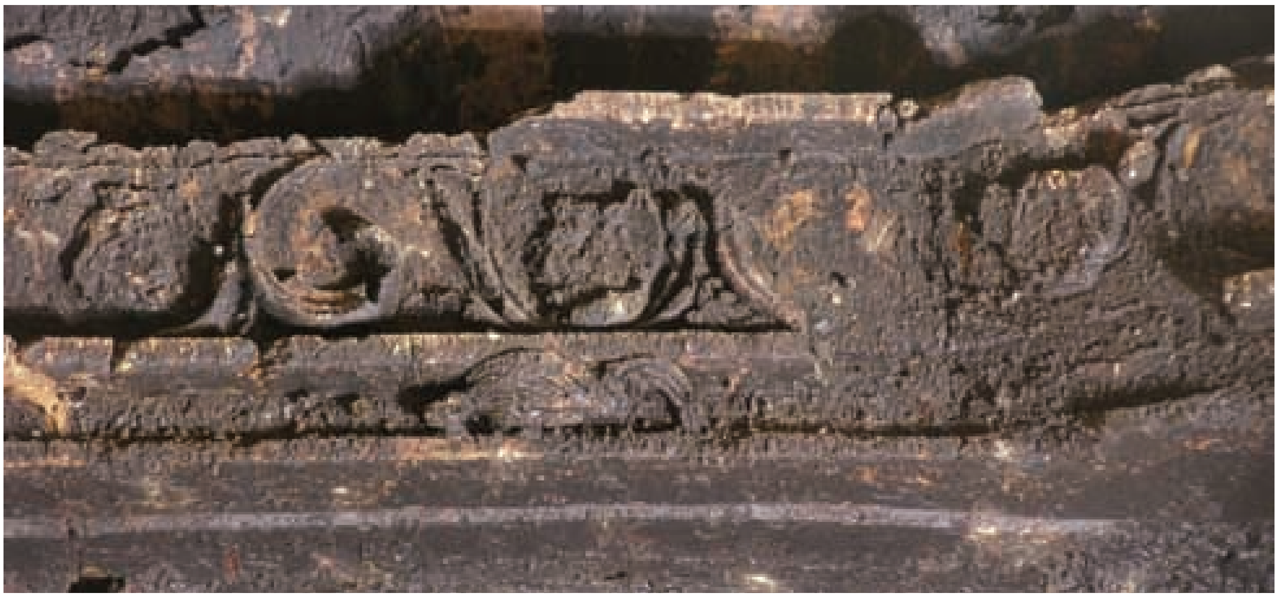


Figure 117 Cave U: second cornice – relief (1).

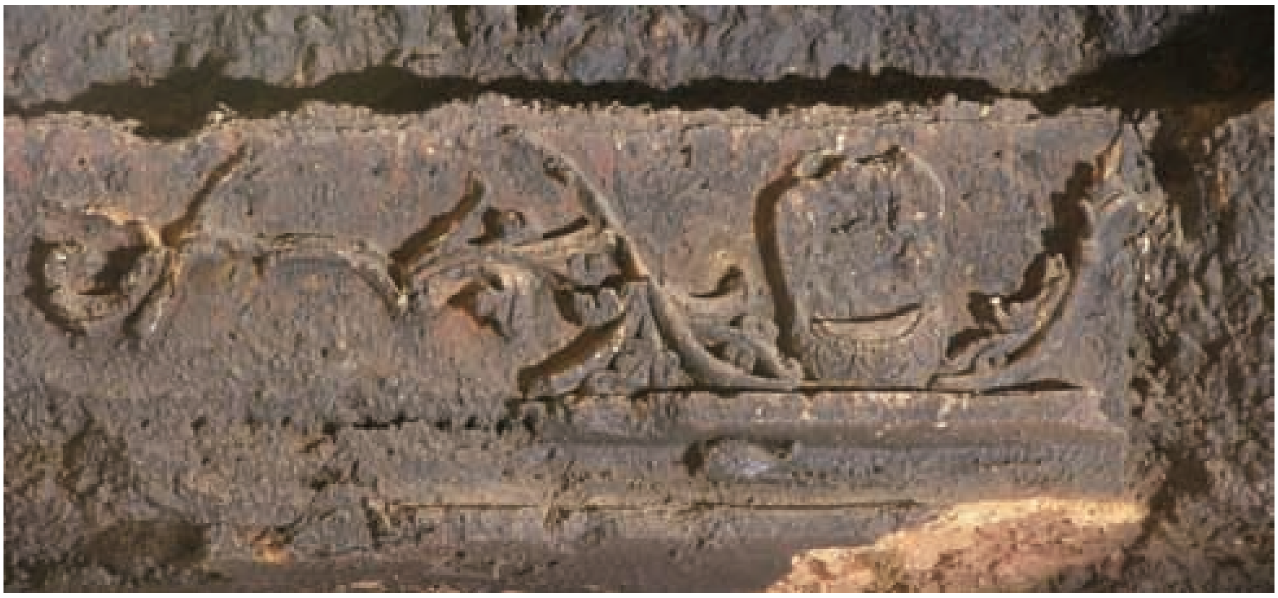


Figure 118 Cave U: second cornice – relief (2).

Cave T

Location: Cave T is on the eastern side of the Great Cliff in Bamiyan, located to the west of Cave U.
Form: Square plan; domed ceiling; first and second tambours; first and second cornices. Cave T has a square plan with a domed ceiling. Niches with various shapes were carved into the side walls, the tambours, and the dome's sub-base, which are also covered with three-dimensional decorations. On the northern side, a large niche touches the second cornice.
Technique and design: Each wall has three niches with rims arcaded with an arch and a pilaster. While the top of the niche itself is a half-dome, that of the rim is pointed. This decorative rim with three-dimensional engravings was partially covered with wall clay in a later period. The first cornice is round. In the four re-entrant angles of the side walls, the bases remain in the shape of a triangle (Fig. 124). The first tambour is fitted with a series of trefoil arches, whose supporting points feature a hole for a possible pilaster. It is therefore plausible that the first tambour also used to be arcaded. It seems that a statue could have fitted inside the arch based on the mortise at the centre of the back wall of the trefoil arch, which corresponds to a square pedestal carved above the first cornice. Each arch is rimmed with a band. A portion of each was partially coated in a later period, as were the rims of the niches on the side walls.

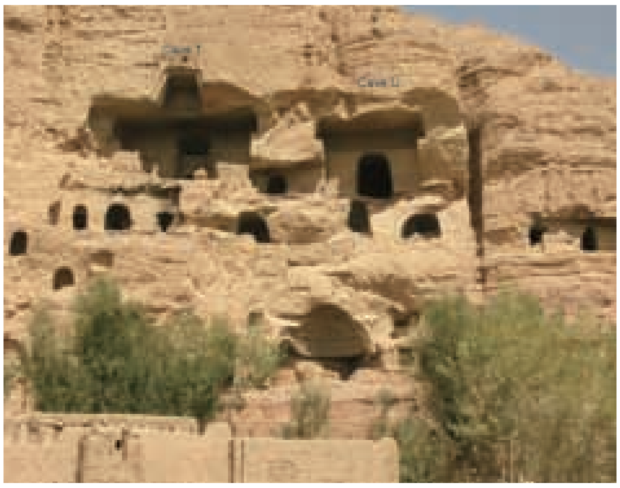


Figure 119 Cave T: façade.

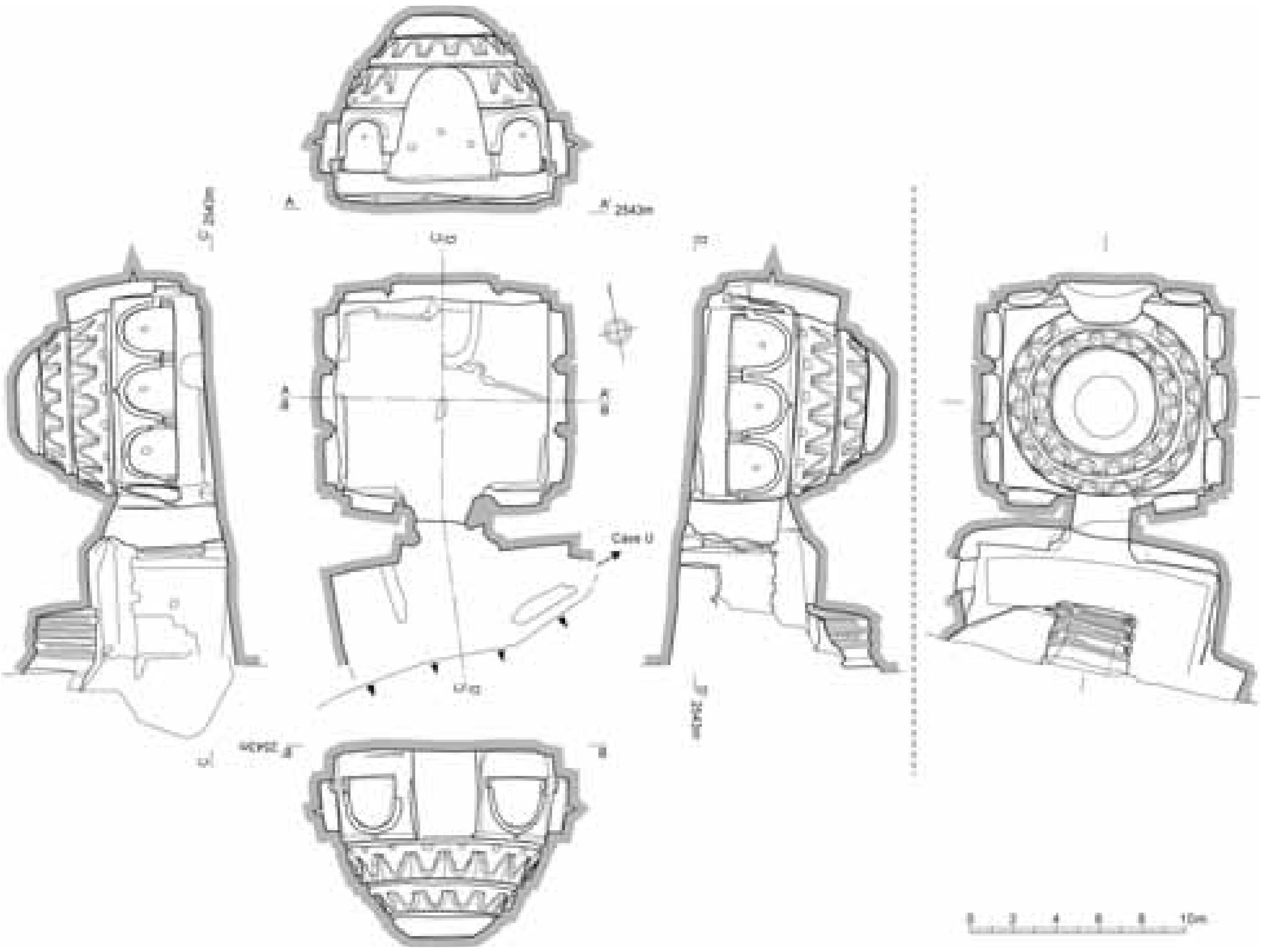


Figure 120 Cave T: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

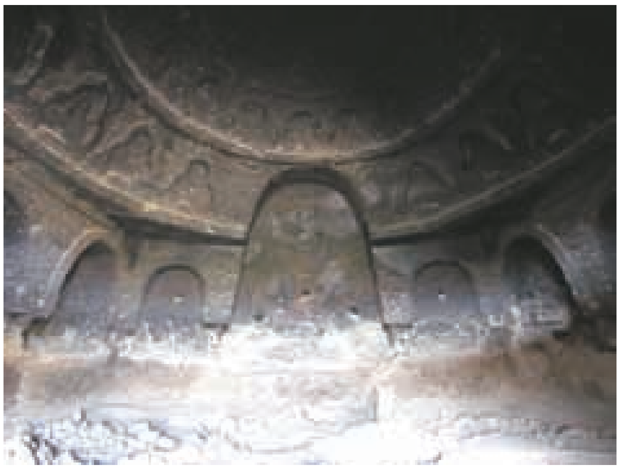


Figure 121 Cave T: northern side.

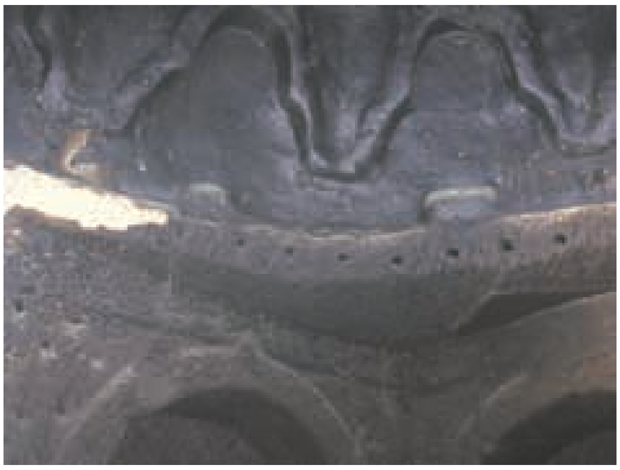


Figure 124 Cave T: first cornice.

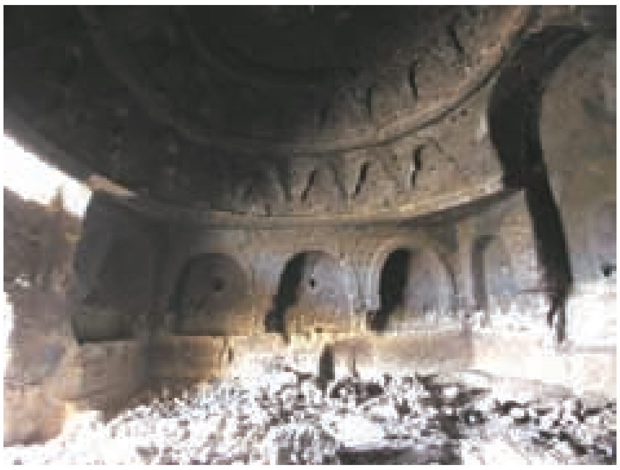


Figure 122 Cave T: western side.

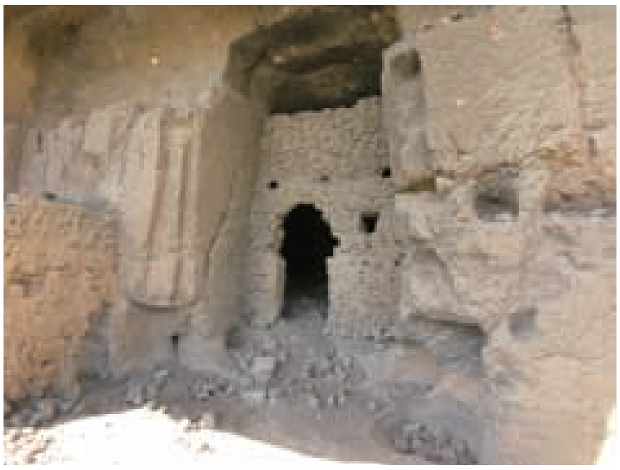


Figure 125 Cave T: entrance.

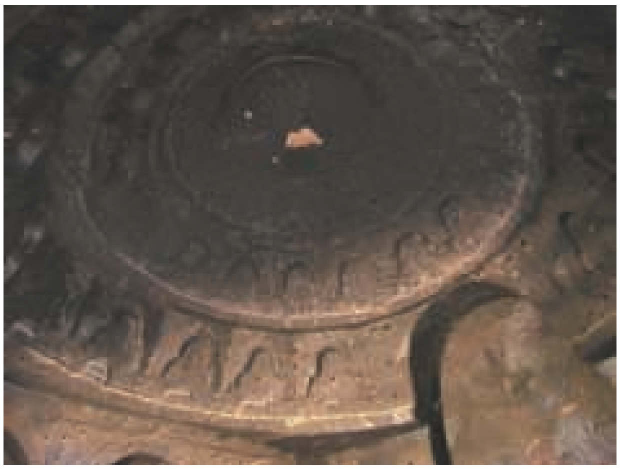


Figure 123 Cave T: ceiling.

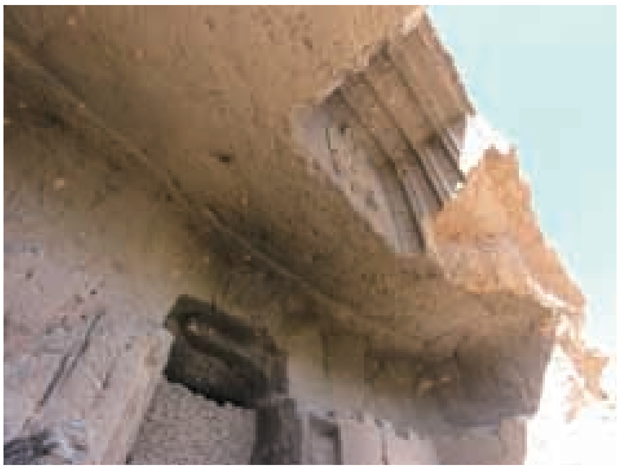


Figure 126 Cave T: upper part of the forecourt.

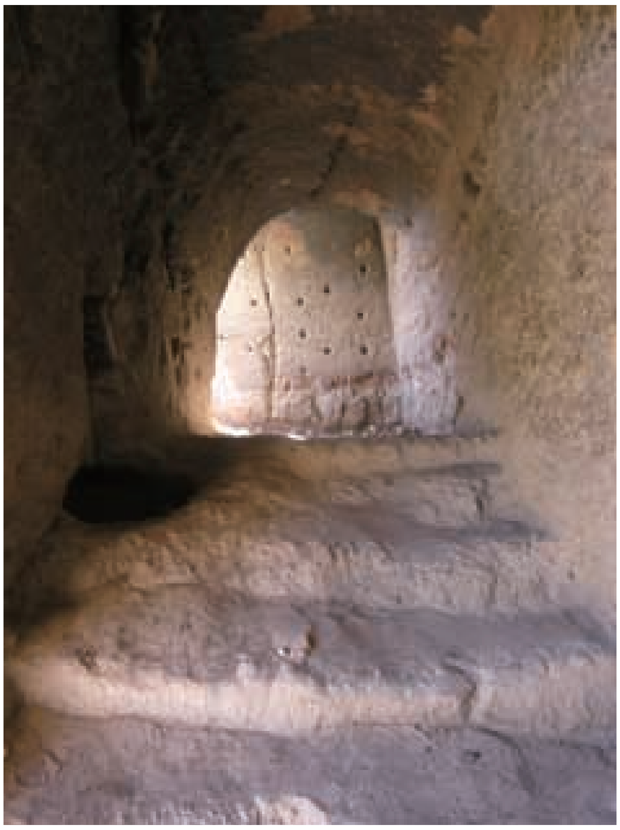


Figure 127 Cave T: step corridor to Cave T.

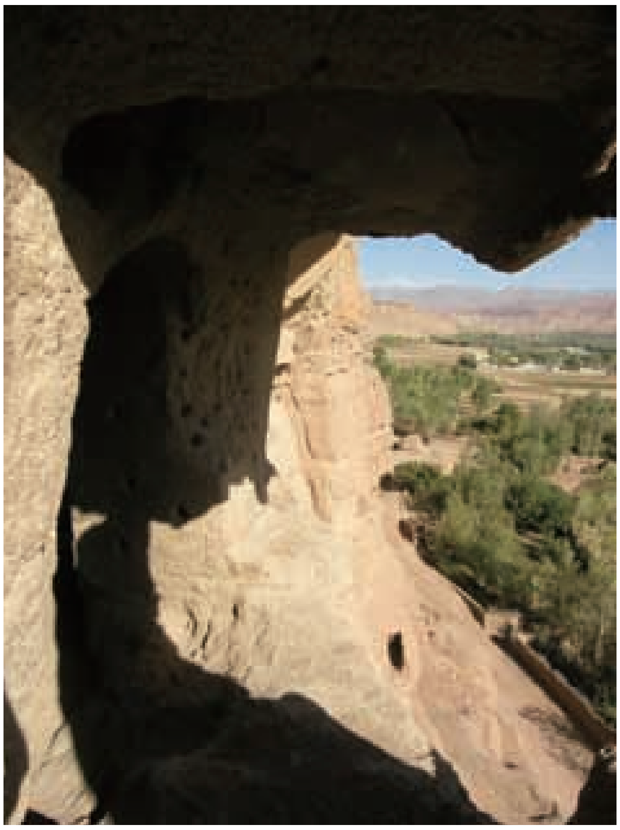


Figure 128 Looking towards Cave U from the forecourt of Cave T.

The second tambour is also engraved with a series of half-round arches. Many remaining mortises on these arches suggest the existence of statues and pilasters. On the upper part of the side walls in the forecourt are concaves for possible timbers, and there is also an engraved ledge wider than the forecourt. There is a trapezoidal niche in the front of the forecourt on the cliff side. At the centre of this niche, the indication of a halo of the Buddha remains (Fig. 126).

While the half-landing of the step corridor on the eastern side of the forecourt is now collapsed on the southern side, the corridor could have originally reached Cave U, as its floor height is the same as that of the forecourt of Cave U. This corridor is about 2 m wide, which is relatively large for the Bamiyan site. The side wall has many mortises (Fig. 127). It is a pathway with three-dimensional decorations on the wall.

Present condition: The surface of the cave is covered with a thick layer of black soot. Numerous cracks run inside the cave and the side walls of the entrance, some of which reach the ceiling. They are parallel with each other and were presumably caused by the constructive condition of the rock.

Area from Caves V to Cave 52

Although the space west of the lower area of Cave T and Cave U is badly collapsed, there are some caves scattered throughout the area that are important from an architectonic viewpoint. Caves V are situated just under Cave T. The forecourt of Caves V is currently a gateway to Cave T (Fig. 132). Cave V(d) on the eastern side has a rectangular plan and a *laternen-decke* engraved two-thirds of the distance in from the front. Caves V consist of Cave V(a) and Cave V(c), in addition to Cave V(d). Cave V(a) has a rectangular plan, and Cave V(c) has a square plan with a domed ceiling. These three caves share Cave V(b) as a forecourt, the southern half of which has collapsed.

Cave 41, in front of the path up to Caves V, has a square plan, polygonal tambour and domed ceiling, although it has severely collapsed (Fig. 133). The steps from Cave 41 to Caves V retain some holes on the treads of the side walls, indicating the possibility that boards were placed on the treads. Cave 46 has also collapsed. It had a large square plan measuring about 7.5 cm on a side, along with a domed ceiling (Fig. 134). There are horizontal mortises remaining between each rung of the three cornices, from the first tambour to the ceiling.

Cave 48 is half-collapsed. This cave features a square plan and a domed ceiling. The dome is supported by

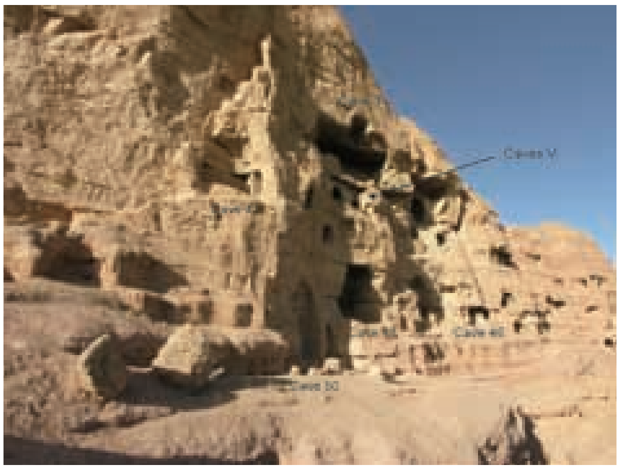


Figure 129 Region of Caves V–Cave 50.

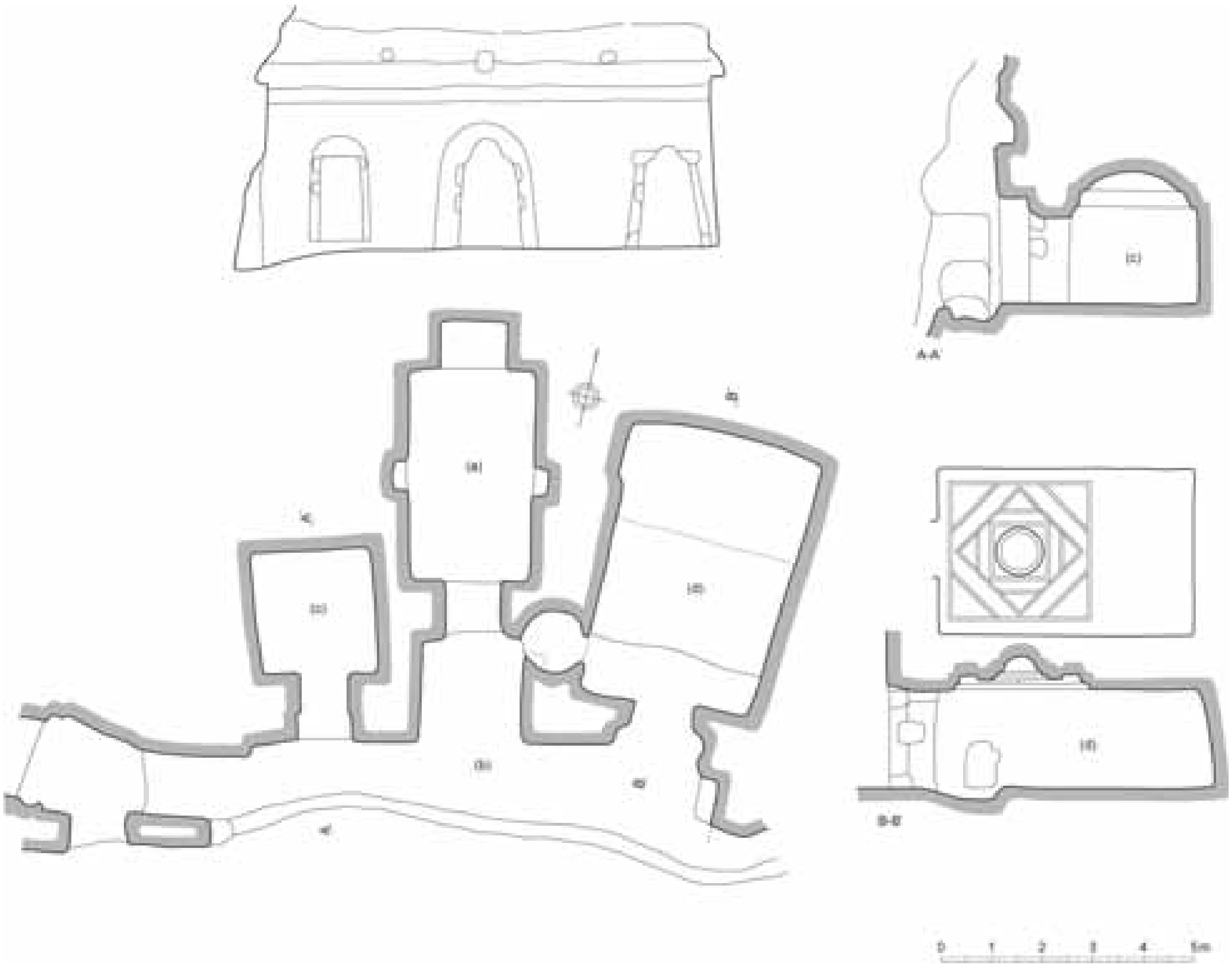


Figure 130 Caves V: plan, elevation of the forecourt. Cave V(c): section. Cave V(d): section; ceiling (after Kodera *et al*. 1971).

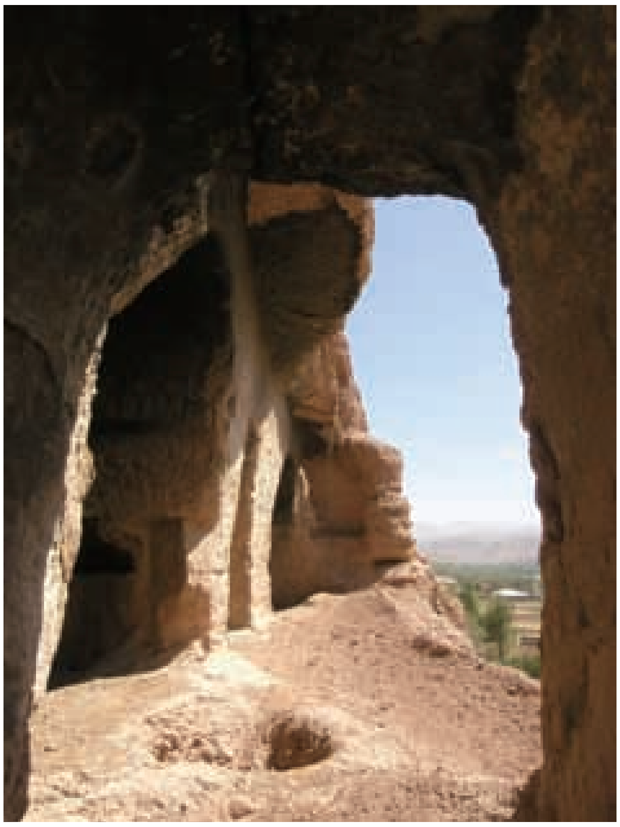


Figure 131 Cave V(b): forecourt.

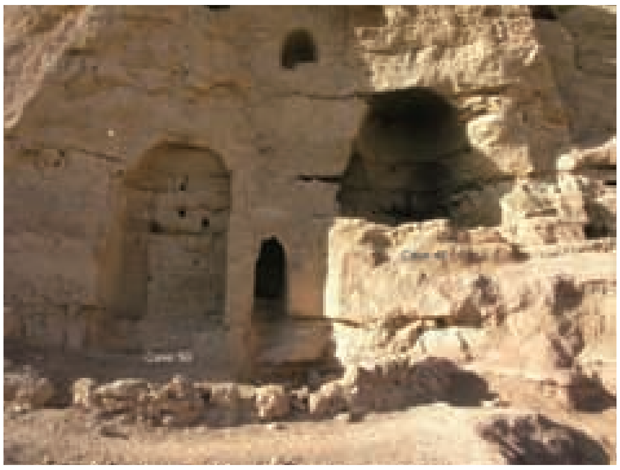


Figure 132 Region of Cave 50 (cave-niche).

squinches with septuplicate arches (Fig. 135). Even the current remaining portion has a width of more than 5 m and a height of just less than 6 m, evidence that the cave is large for this type and the ceiling in particular is extremely high. The step leads down from the side wall of the western back of Cave 48. It is likely that the step was added in a later period, based on the rough and haphazardly planned appearance of the area around Cave 48.

Just to the west of the bottom of a flight of stairs is a cave-niche (Cave 50) with a height of 6.65 m (Fig. 136).

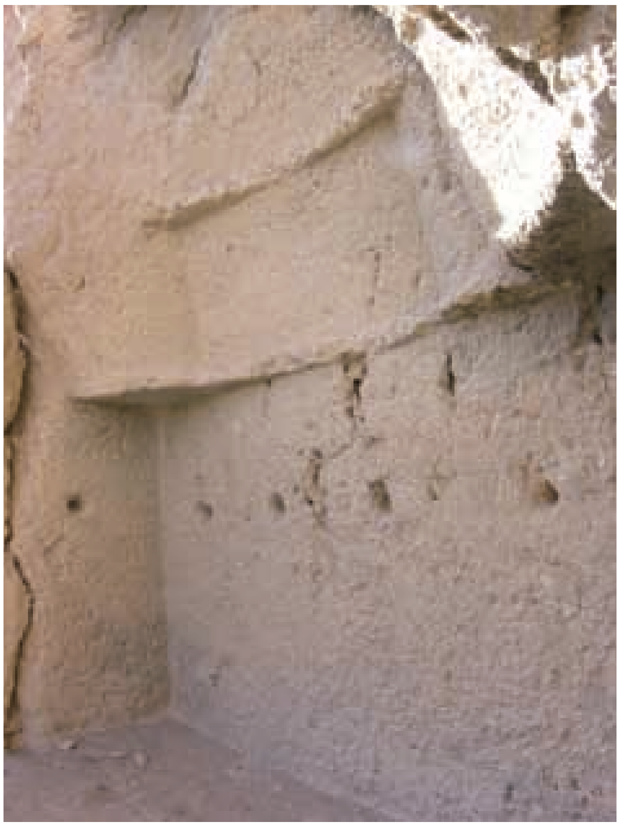


Figure 133 Cave 41: northern side.

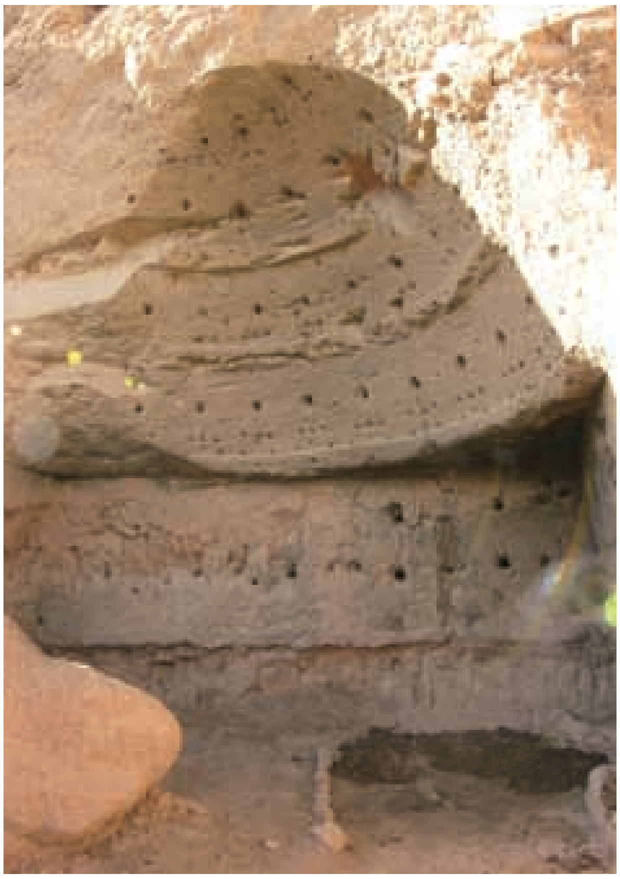


Figure 134 Cave 46: northern side.

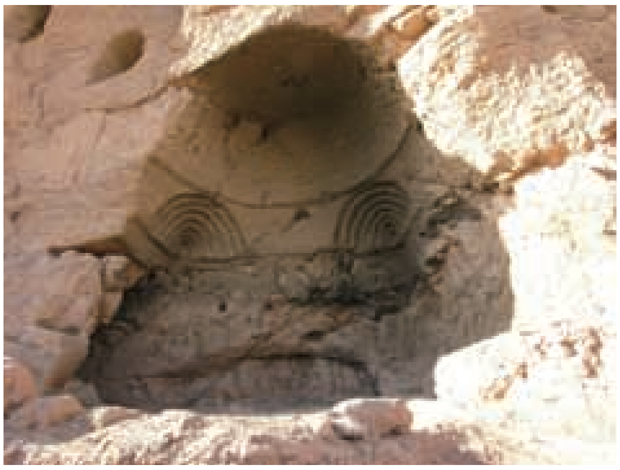


Figure 135 Cave 48.

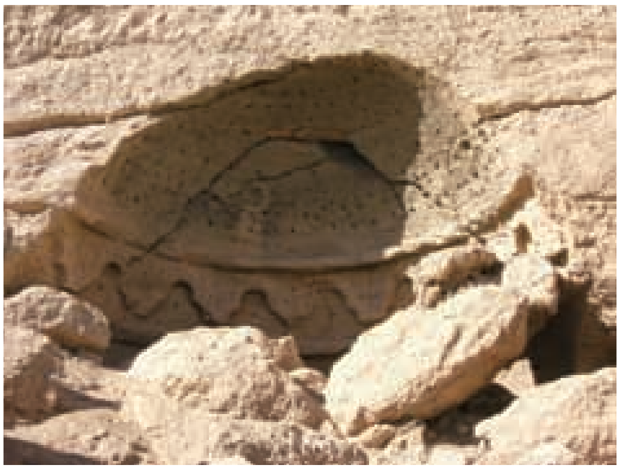


Figure 137 Cave 52.

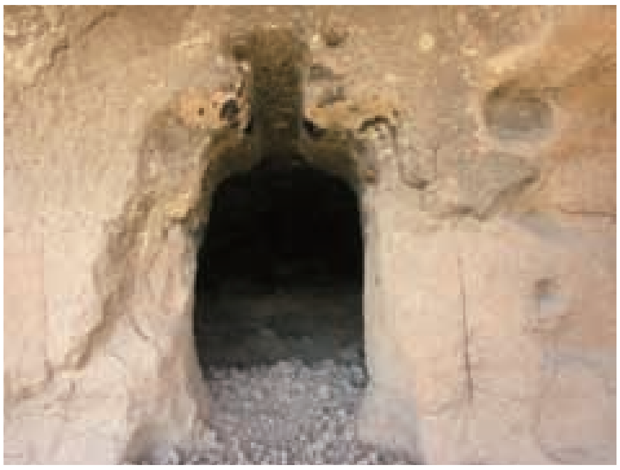


Figure 136 Cave 50 (cave-niche).

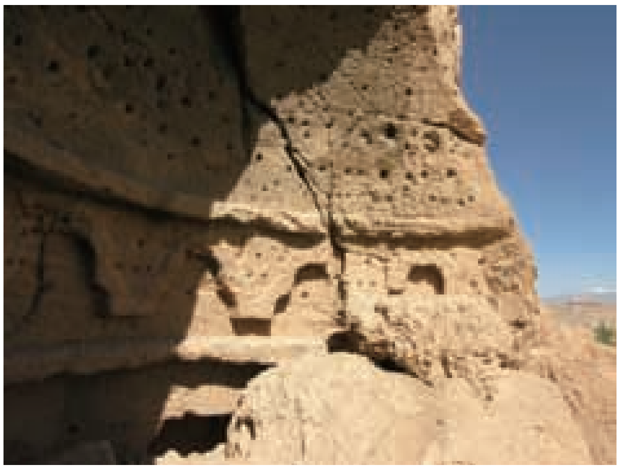


Figure 138 Cave 52: tambour.

Cave 52 is west of this cave-niche. Although Cave 52 is half-demolished, it features an octagonal plan with a trace of a square plan and an elaborately decorated dome (Fig. 137). The niche on the side wall has a blue painting inside.

It is difficult to understand the relationship of the caves based only on their plans because this area is badly damaged and no connecting passages remain. Presumably because of its condition, this area has until now not been sufficiently investigated. During this survey, however, many important caves with elaborate decorations, mainly the cave-niche, were confirmed in this area.

Cave G

Location: Cave G is situated on the lower part of the cliff between Caves F and Cave T, on the eastern side of the Great Cliff in Bamiyan.

Form: Cave G has already been demolished. The remnants indicate that this cave had a square plan and a domed ceiling with an engraved squinch in the corner (Figs 141, 142). The trace of a stupa was previously confirmed in the centre of the floor.

Present condition: Only the northern side and a portion of the eastern side still remain; the other sides have almost entirely collapsed.

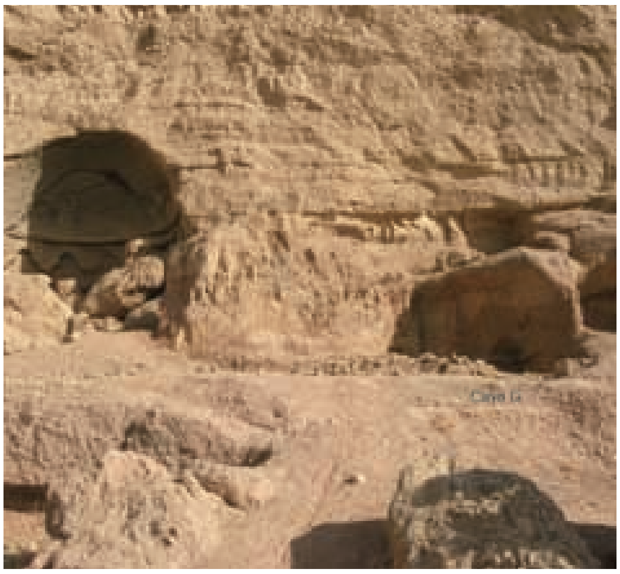


Figure 139 Cave G: façade.

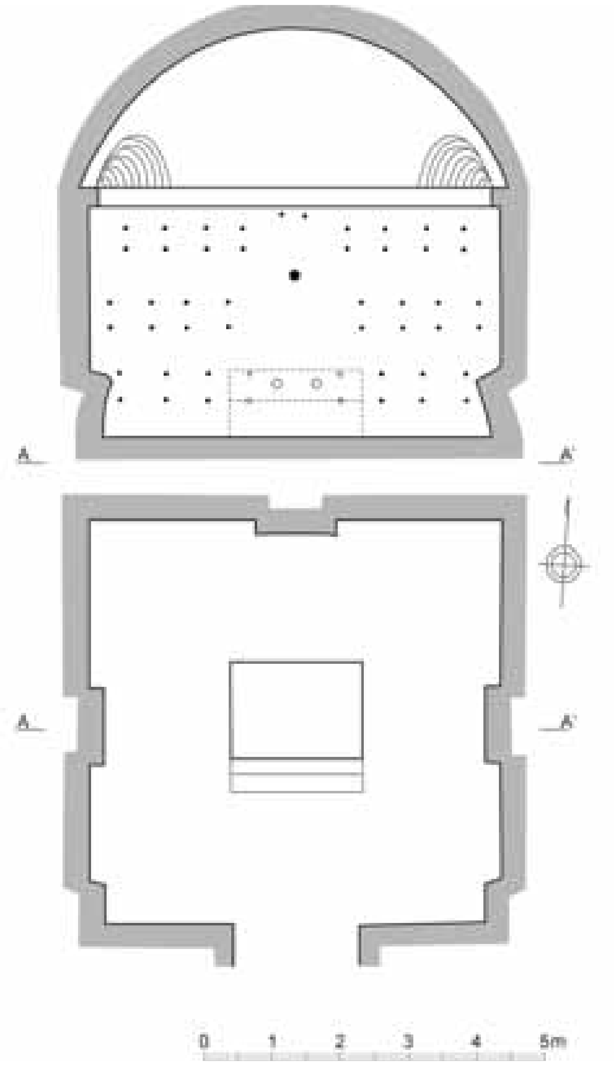


Figure 140 Cave G: plan; section (after Hackin and Carl 1933)

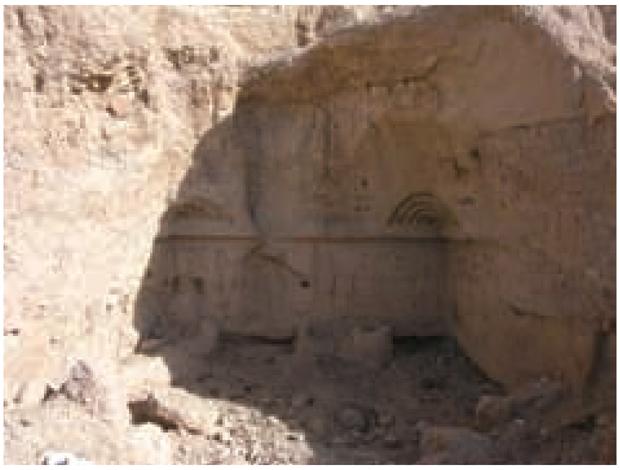


Figure 141 Cave G: northern side.

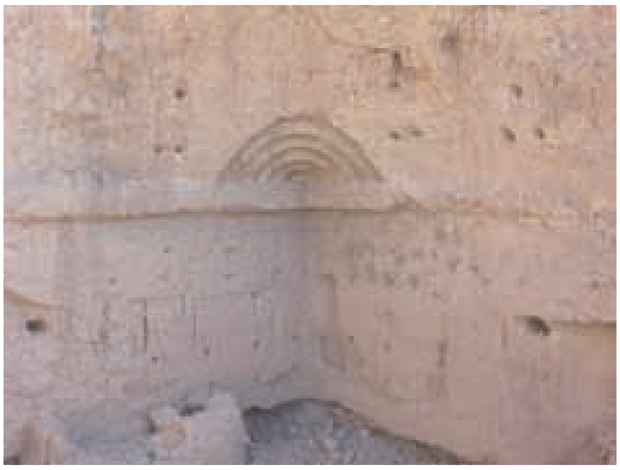


Figure 142 Cave G: squinch at the northeast corner.

Caves F

Location: Caves F are situated between the east end of the eastern side of the Great Cliff in Bamiyan and the East Giant Buddha. Caves F consist of Cave F(a), Cave F(b) and Cave F(c). Cave F(a) has an octagonal plan, Cave F(b) has a simple rectangular plan and Cave F(c) has a square plan. As the southern side of the cliff of the forecourt has collapsed, it is difficult to access the caves.

Cave F(a)

Form: Octagonal plan; domed ceiling; tambour. The side walls each have niches and the round tambour is arcaded with a trefoil arch. Cave F(b) is next to Cave F(a) and has a rectangular plan with a vaulted ceiling. Cave F(a) and Cave F(b) share the forecourt.

Technique and design: The plan and the design inside the cave are geometrically arranged. The niches and many mortises on the side walls are evenly aligned. The ceiling also has mortises arranged in a concentric fashion. These suggest that a three-dimensional statue must have been situated here. The trefoil arcade on the tambour and the cornices above and below the tambour are made of rammed earth with distinct edges. On the face, a three-dimensional arabesque is engraved (Fig. 148). It has also been thoroughly documented that rims with elaborate trefoil-shaped arches created by modelling were installed with tenons.

Present condition: As Cave F(a) nestles in an elevated location, and the southern side of the cliff of the forecourt has collapsed, it is not easy to reach this cave. Currently, the entrance to the cave is closed with a door to protect the mural paintings. Many east–west cracks run on the side of the south entrance, eastern and western side walls, and the floor (Fig. 145).

Cave F(c)

Form: Square plan and *laternen-decke* with two staves. A front room with a rectangular plan was added to the south of Cave F(c).

Technique and design: While Cave F(c) is a small cave measuring little more than 3 m in width and about 2 m in height, it seems to have contained many mural paintings. On the western side of the front room is a trapezoidal niche, above and below which a trace of the frame to be fitted with timbers was found (Fig. 151). On the cliff above the front room, four square holes are evenly aligned. This pattern indicates that a wooden structure such as a canopy may have been attached here (Fig. 143).

Present condition: The current passage to Cave F(c) is a stair from the front of Cave F(b). This stair is approximately 140 cm high and its design is slightly out of alignment with the surrounding structure, suggesting the possibility that it could have been constructed later, after the original access point had been damaged by the cliff's deterioration. The entrance is closed with a mud brick wall and a wooden door to protect the mural paintings. A crack runs vertically on the western wall of the cave.

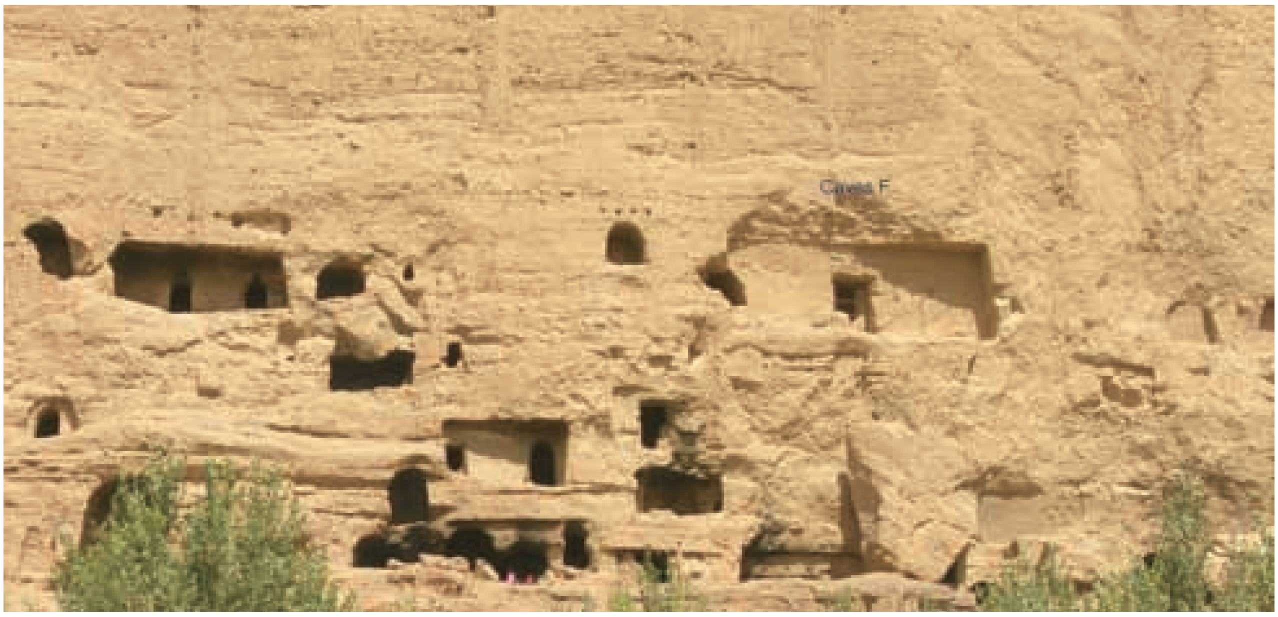


Figure 143 Caves F: façade.

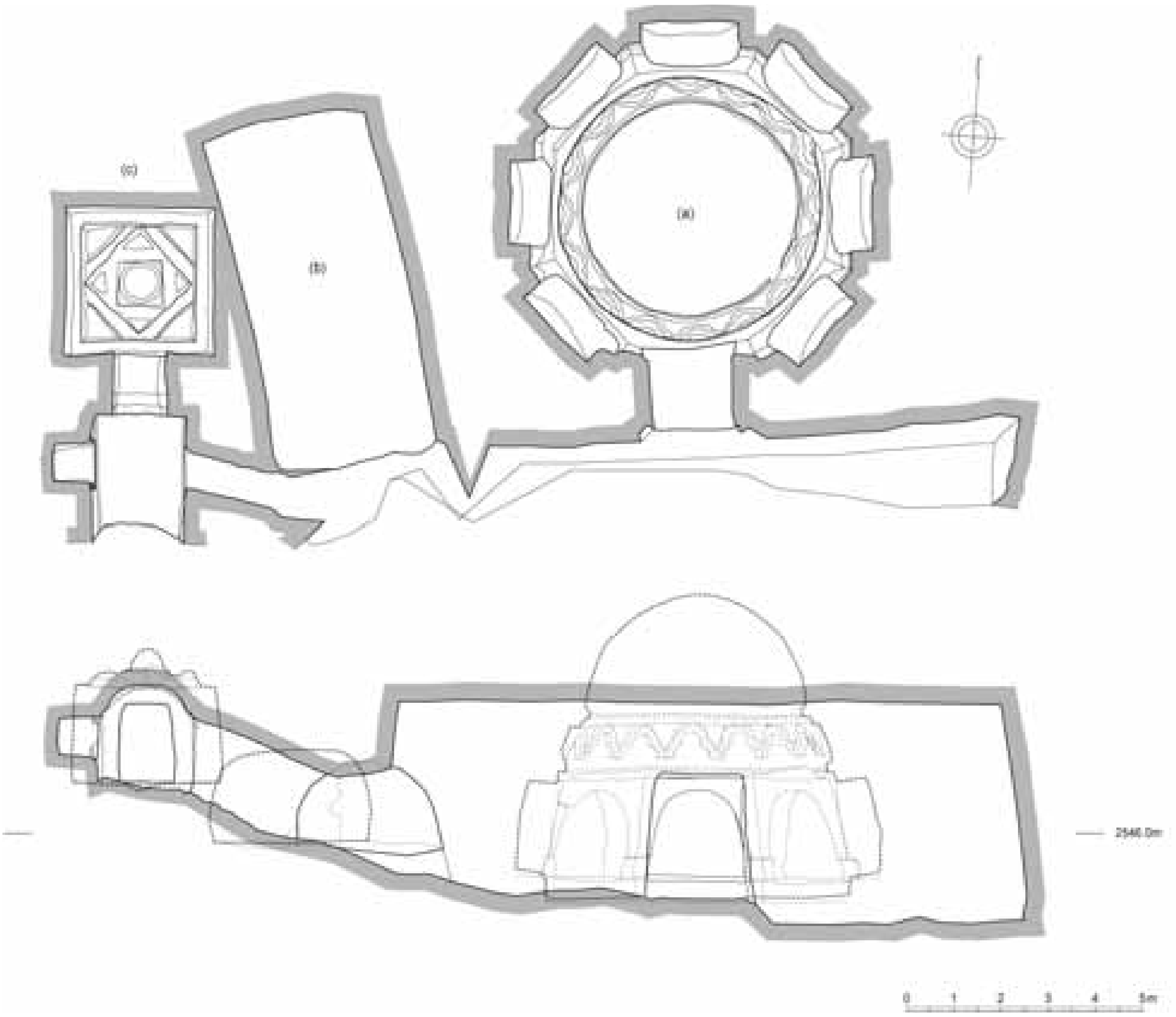


Figure 144 Caves F: section; ceiling (measured by PASCO Corporation, Japan, in 2005).

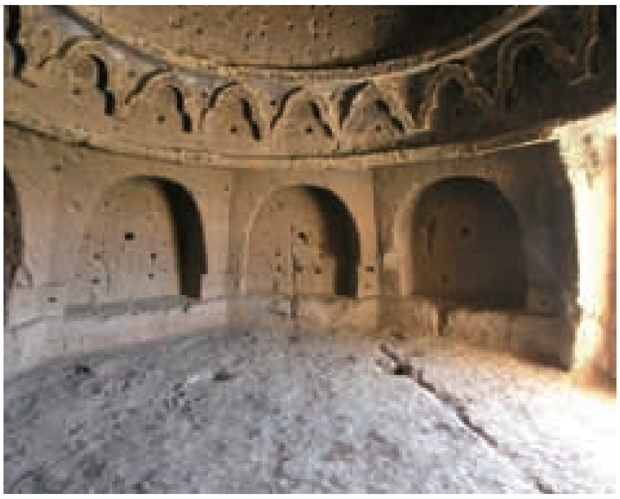


Figure 145 Cave F(a): eastern side.

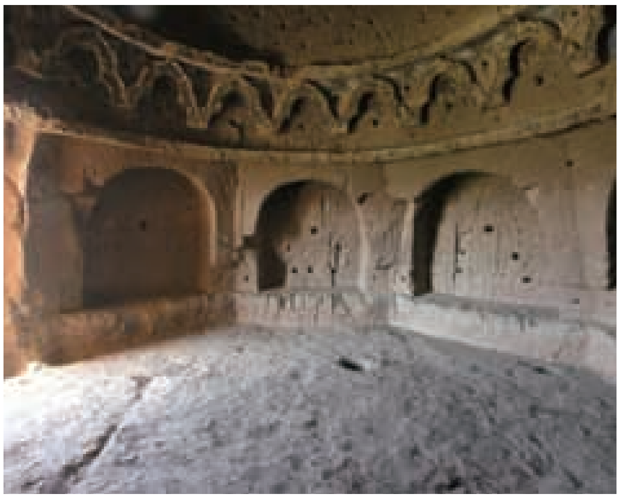


Figure 146 Cave F(a): western side.

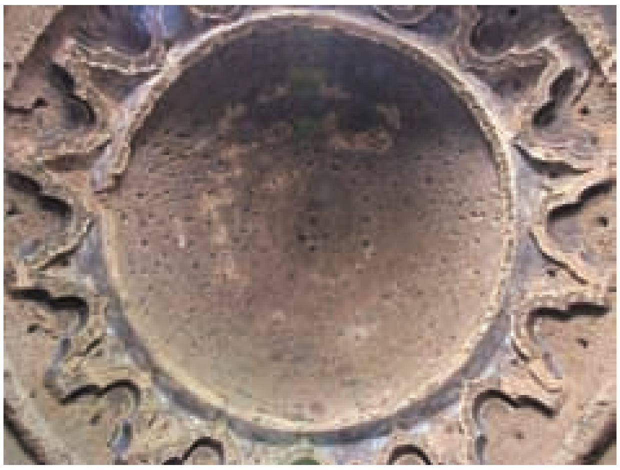


Figure 147 Cave F(a): ceiling.

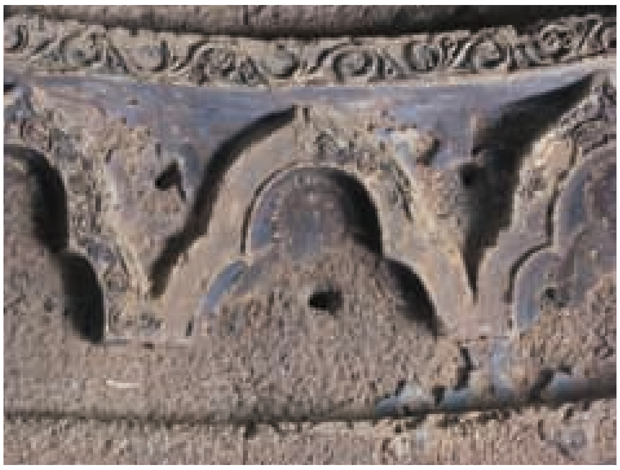


Figure 148 Cave F(a): trefoil-shaped arcading on the tambour.

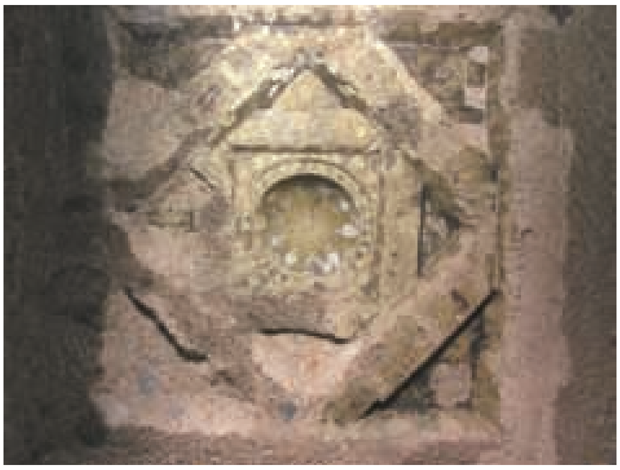


Figure 149 Cave F(c): ceiling.

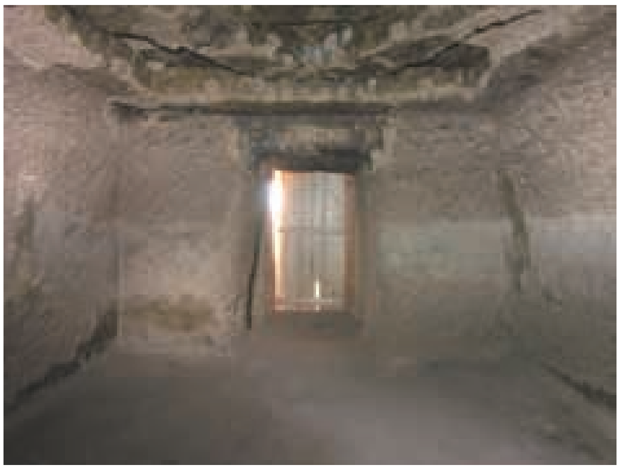


Figure 150 Cave F(c): southern side.

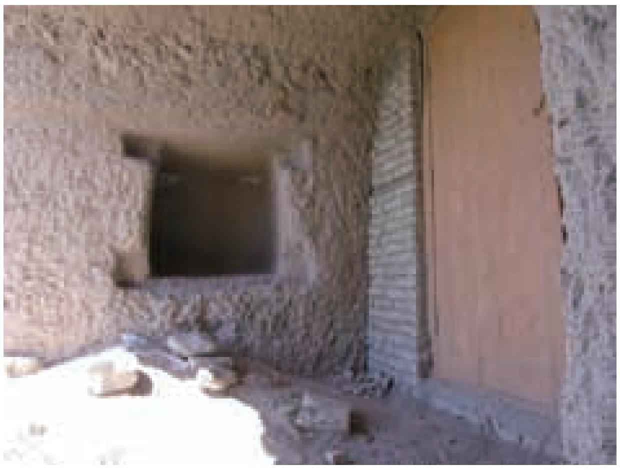


Figure 151 Cave F(c): western side of the forecourt.

Caves F1

Location: Caves F1 are located below and to the west of Caves F. Caves F1 consist of two square-plan caves that share a forecourt.

Form: Cave F1(a), in the eastern part of the caves, has a square plan measuring approximately 3.8 m on a side, a domed ceiling and a squinch. Cave F1(b), in the western half of the caves, has a square plan measuring about 3 m a side and features a *laternen-decke*. Both caves are small in size.

Technique and design: In the case of Cave F1(a), a squinch is engraved inside the dome, which is rare in Bamiyan. Four pairs of mortises (eight holes total) are evenly aligned on the upper and middle parts of the western wall. On the northern wall, there are three pairs (six holes) (Fig. 157). At the foot of the eastern wall, a bench-style pedestal has been chiselled; the pedestal has a height of approximately 53 cm (97 cm at the north end only) and a depth of about 76 cm (Fig. 156). Several layers have been discovered on the wall, and between the layers there are several mural paintings. The *laternen-decke* of Cave 1(b) is equipped with thin joists and a very low structure (Fig. 159). Several layers of wall clay remain on the ceiling and walls without any mortises.

Present condition: Both caves have black soot covering their entire surface, indicating that they were used as residences. There are some holes remaining in the side walls and the floor in Cave F1(a).

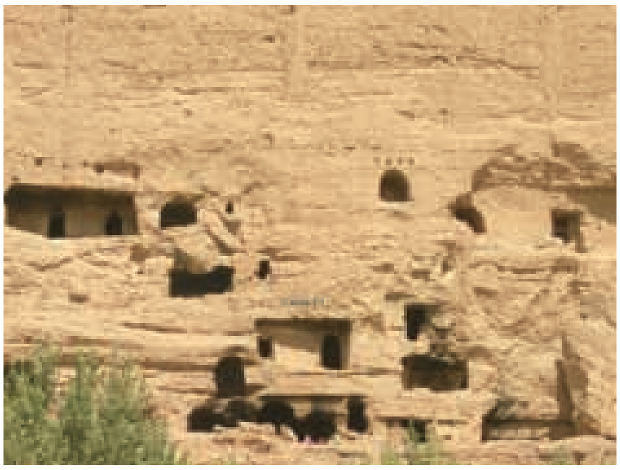


Figure 152 Caves F1: façade.

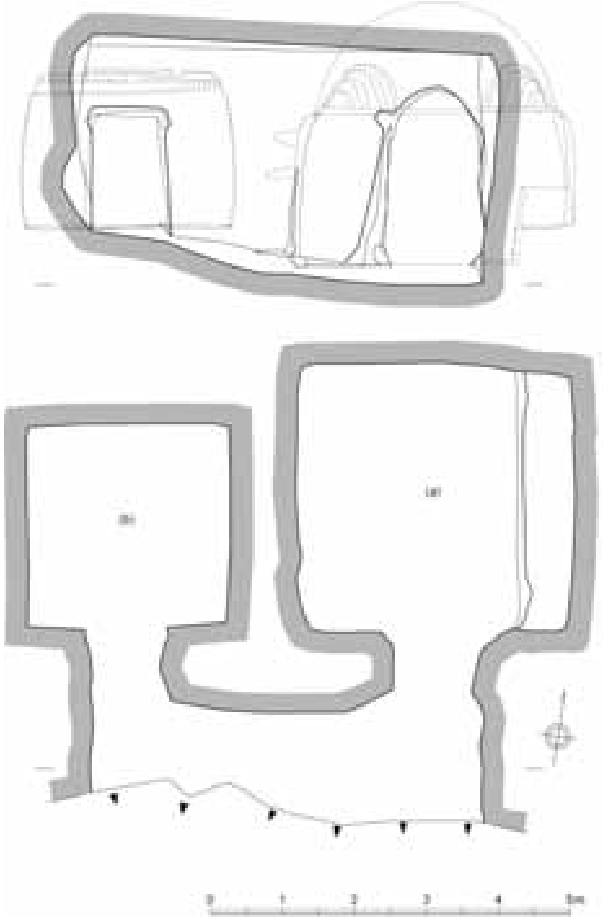


Figure 153 Caves F1: plan; section (measured by PASCO Corporation, Japan, in 2007).

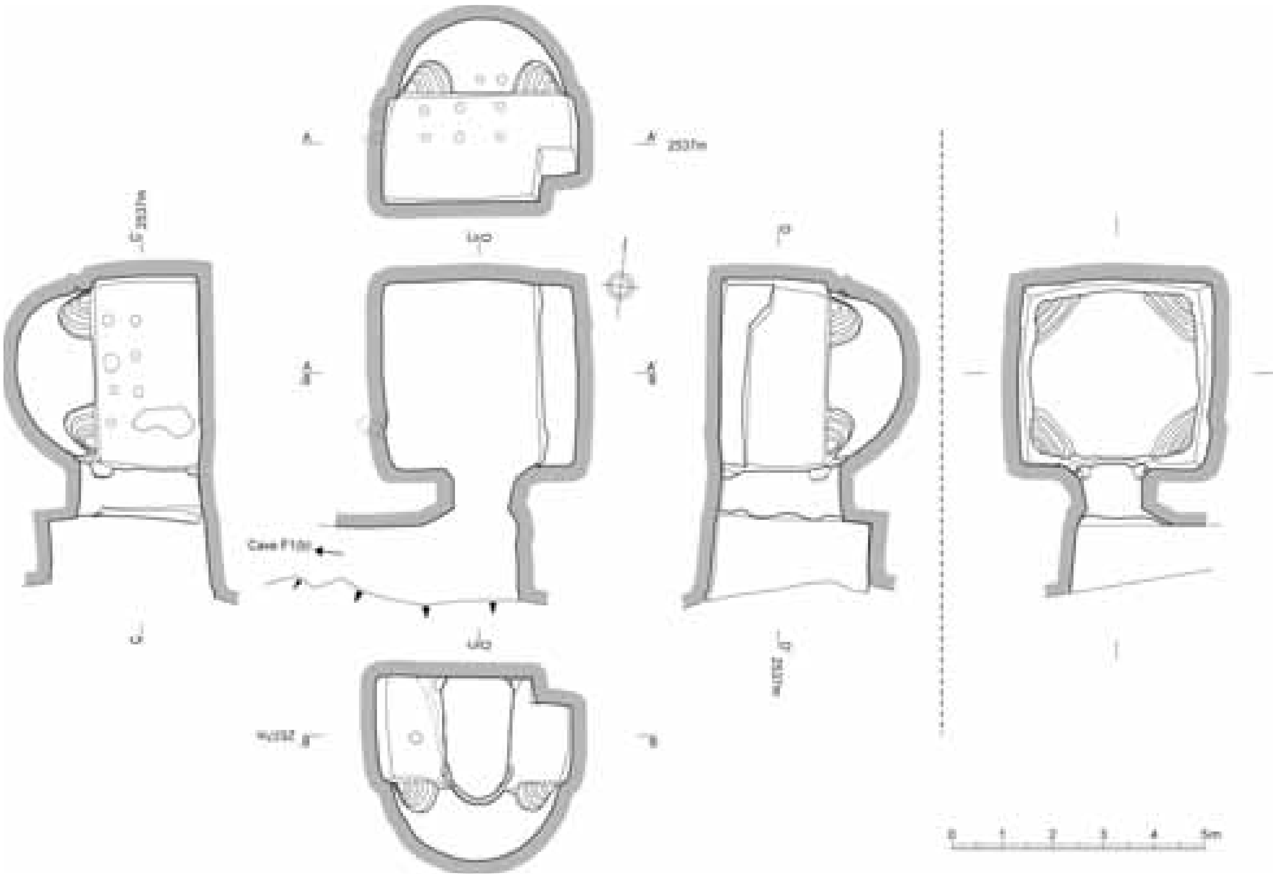


Figure 154 Cave F1(a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

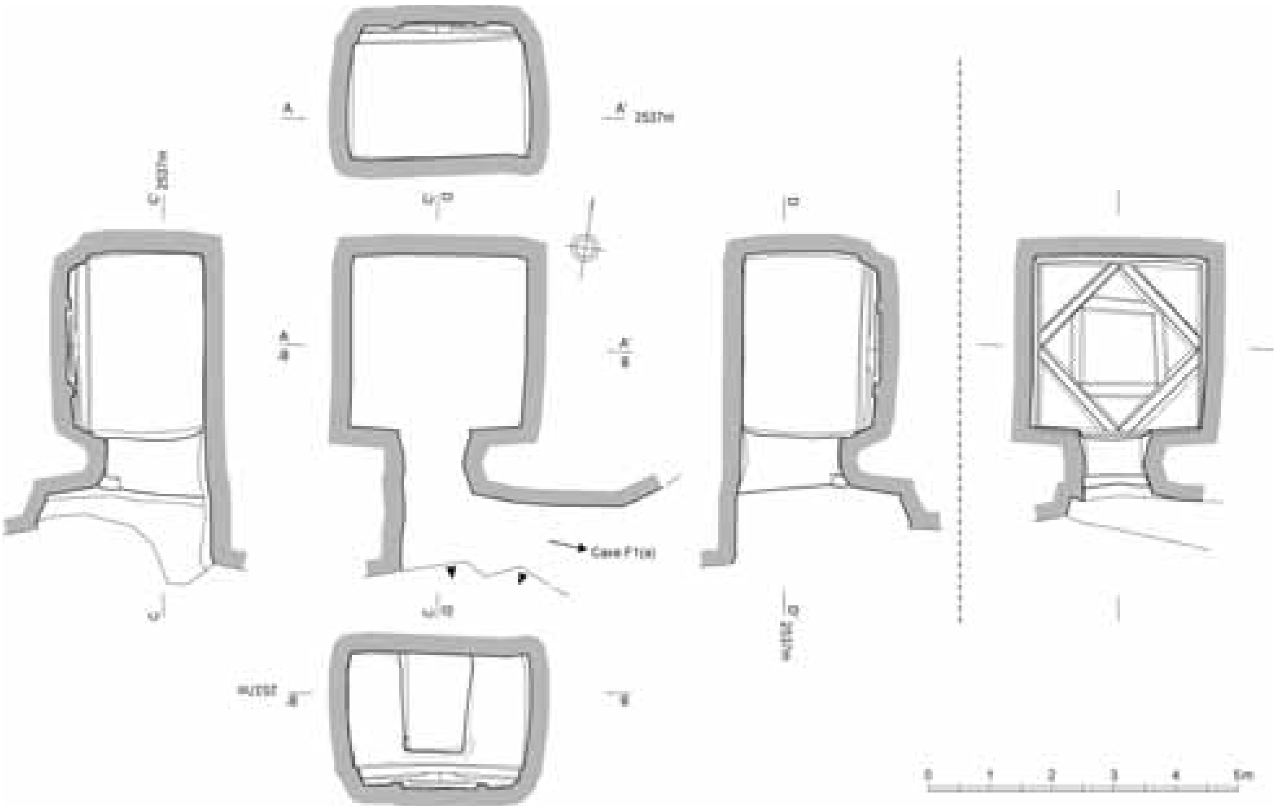


Figure 155 Cave F1(b): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

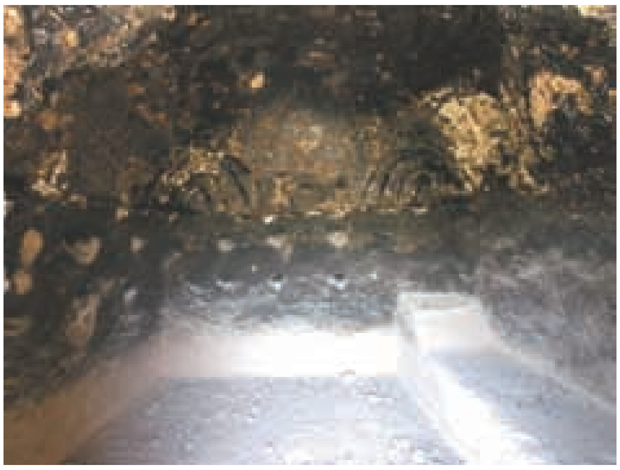


Figure 156 Cave F1(a): northern side.

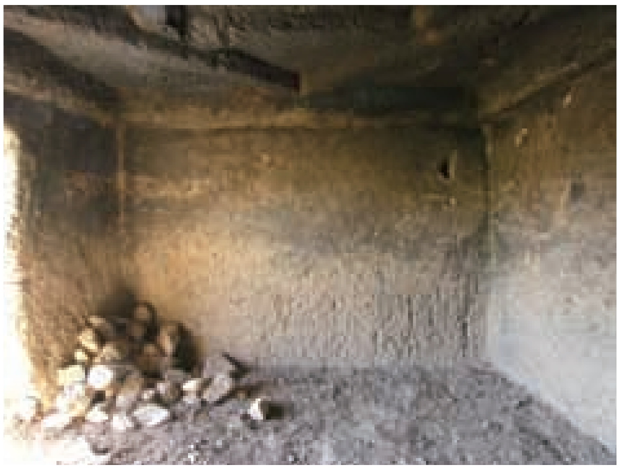


Figure 158 Cave F1(b): western side.

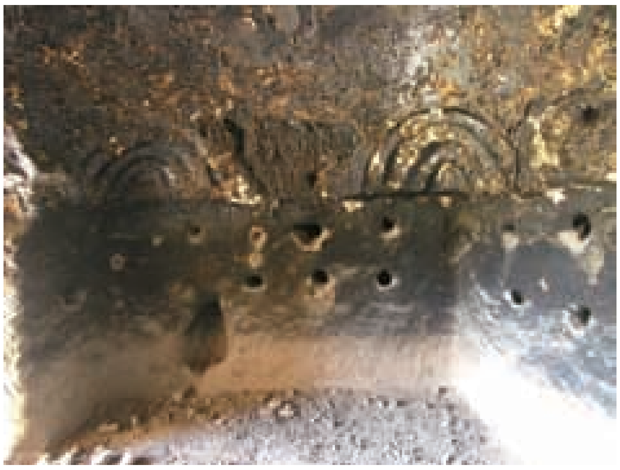


Figure 157 Cave F1(a): western side.

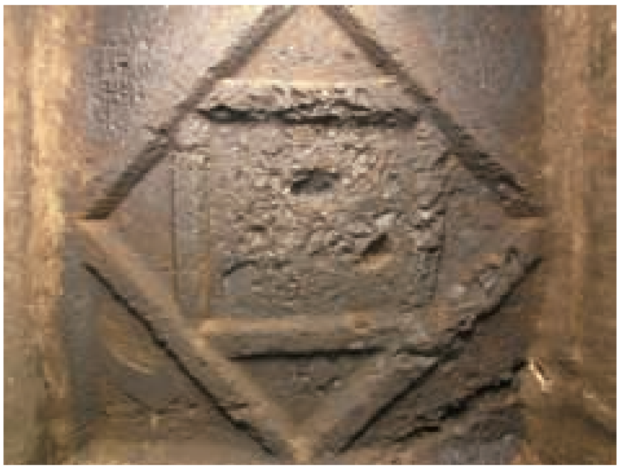


Figure 159 Cave F1(b): ceiling.

Cave 86

Location: Cave 86 is located between Caves I and Caves III on the eastern side of the Great Cliff in Bamiyan. This cave is to the east of Cave 87.
Form: Rectangular plan; moderate vaulted ceiling. There are niches on the northern and eastern walls. The western side has a large entrance to Cave 87.
Present condition: The condition is quite poor. Black soot remains, indicating that this cave was used as a residence, and many changes from a later period have been confirmed.

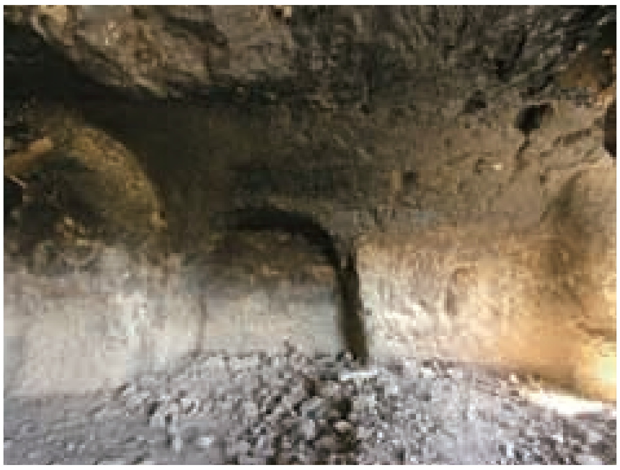


Figure 162 Cave 86: eastern side.

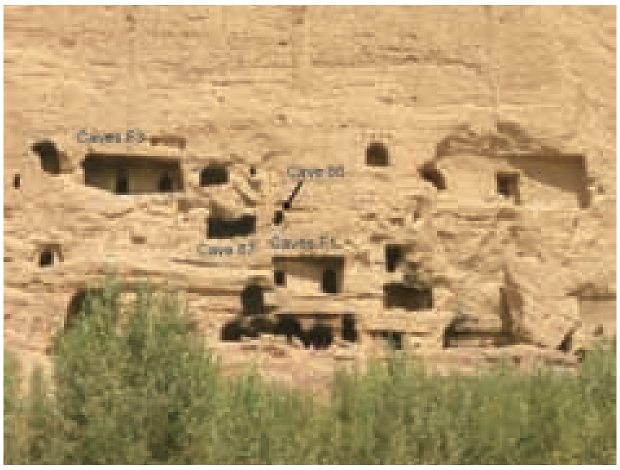


Figure 160 Cave 86: façade.

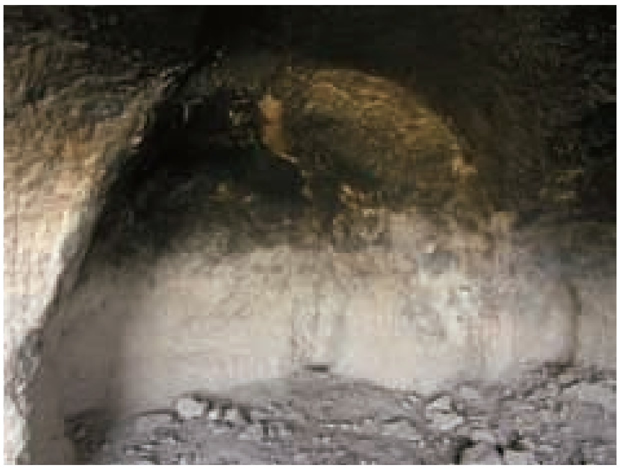


Figure 163 Cave 86: northern side.

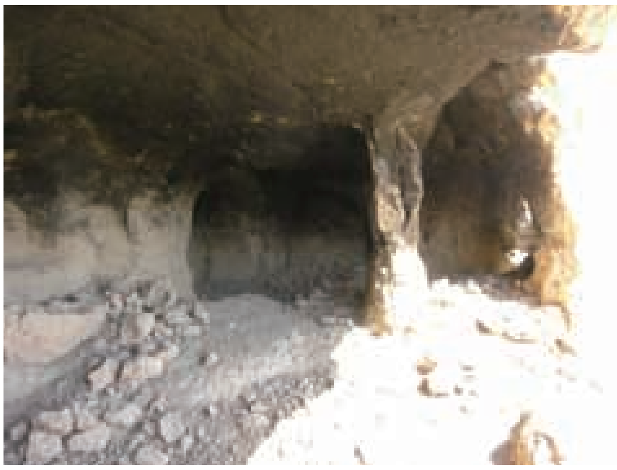


Figure 161 Cave 86: entrance (from Cave 87).

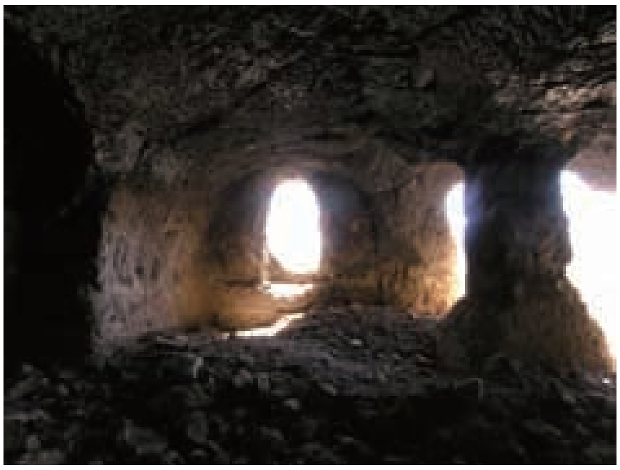


Figure 164 Cave 86: southern side.

Cave 87

Location: Cave 87 is situated between Caves I and III on the eastern side of the Great Cliff in Bamiyan. This cave is to the west of Cave 86.

Form: Rectangular plan; flat ceiling. There are niches on the northern and western walls. On the eastern side, a large entrance to Cave 86 retains part of a pillar.

Present condition: Many changes have been made to Cave 87, making it difficult to discern the original plan. Black soot indicates that this cave was used as a residence. Furthermore, the northern and eastern sides, as well as the floor, were severely demolished in a later period.

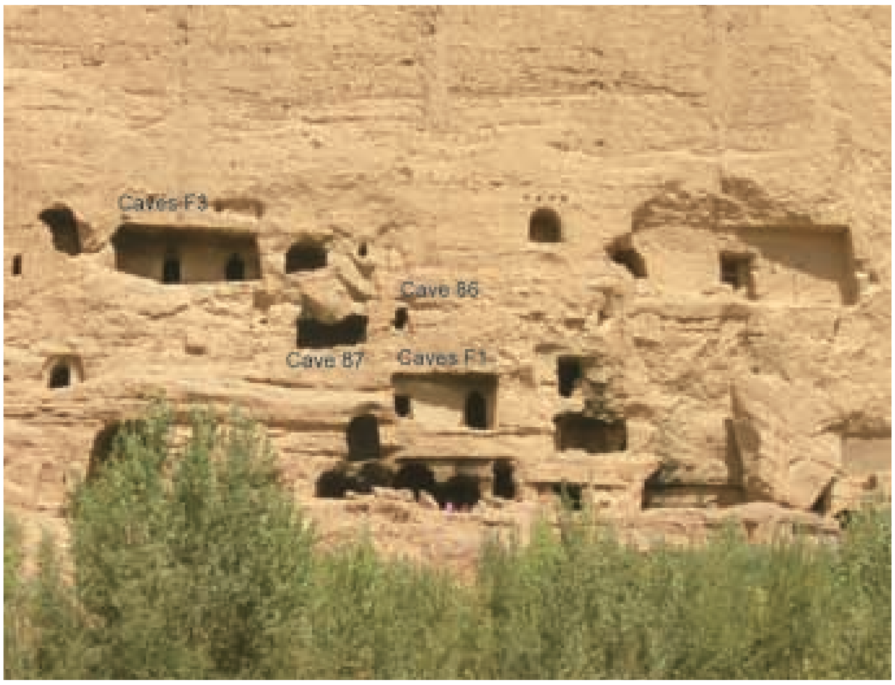


Figure 165 Cave 87: façade.

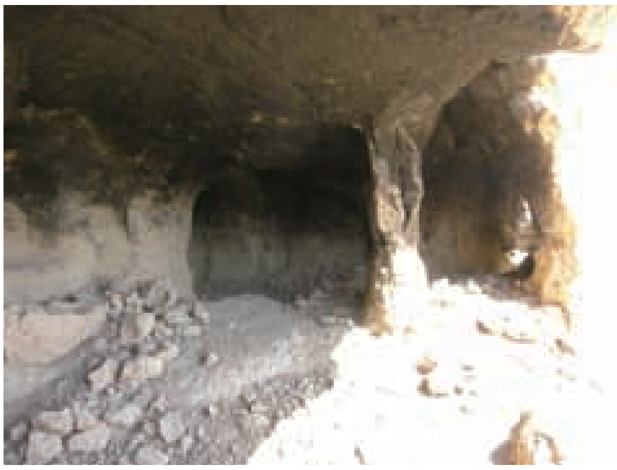


Figure 166 Cave 87: eastern side.

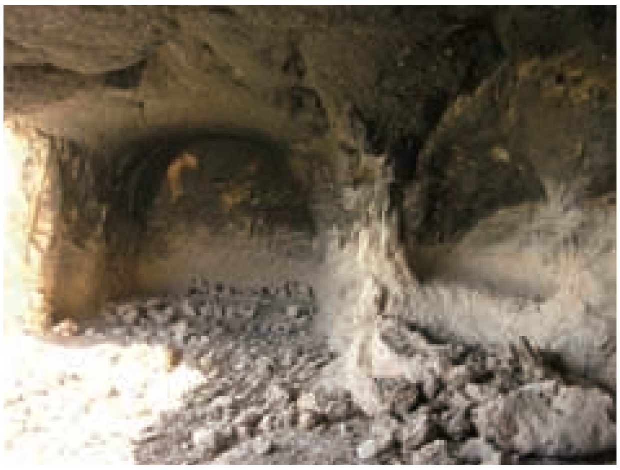


Figure 167 Cave 87: northwest side.

Caves F3

Location: Caves F3 stand above Caves F1 and consist of six caves aligned abreast. Cave F3(d), Cave F3(c), Cave F3(a) and Cave F3(f) open onto a forecourt, Cave F3(b).
Form: Cave F3(e), Cave F3(d) Cave F3(c) and Cave F3(a), in the eastern area of Caves F3, have a rectangular plan with either a vaulted or flat ceiling. Cave F3(f) and Cave F3(g) in the western area feature a square plan and a *laternen-decke*.
Technique and design: Among the mostly finished Caves F3, only the *laternen-decke* of Cave F3(g) is distinctively engraved. Furthermore, this particular cave has many detailed decorations, such as a lattice pattern made by slim pieces of wood outside the first and second joists (Fig. 171). Mural paintings remain on the ceiling. The tops of the entrances to Cave F3(a) and Cave F3(c) have niche-like spaces (Figs 174, 175). To the west of Cave F3(b), the forecourt, a niche in the back wall of the forecourt has a mortise that could have held a Buddha statue (Fig. 172). Cave F3(d) and Cave F3(e) look unfinished (Figs 176, 177). On the upper part of the forecourt, Cave F3(b), a horizontal row of holes suggests that there were wooden structures fixed on the front of Caves F3.
Present condition: As a pathway on the cliff has weathered badly, it is necessary to climb a dangerous slope to reach Caves F3. The interior of each cave is covered with black soot. Some cracks running inside the caves, such as those in Cave F3(g), are due to the original structure of the caves (Fig. 170).

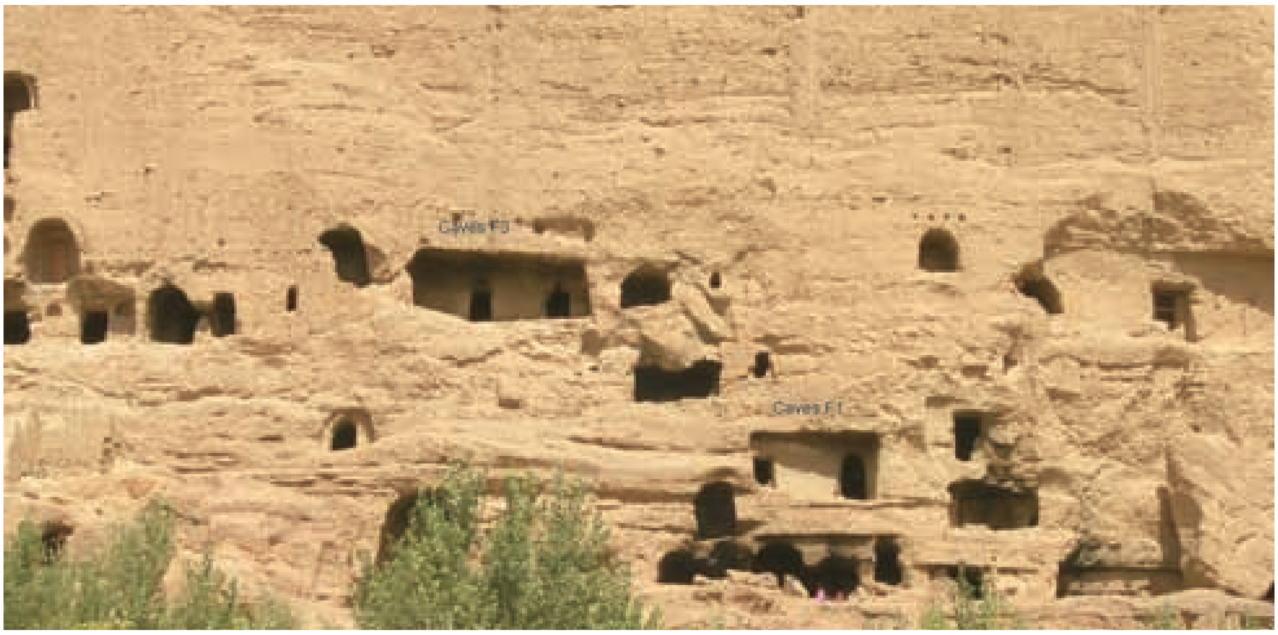


Figure 168 Caves F3: façade.

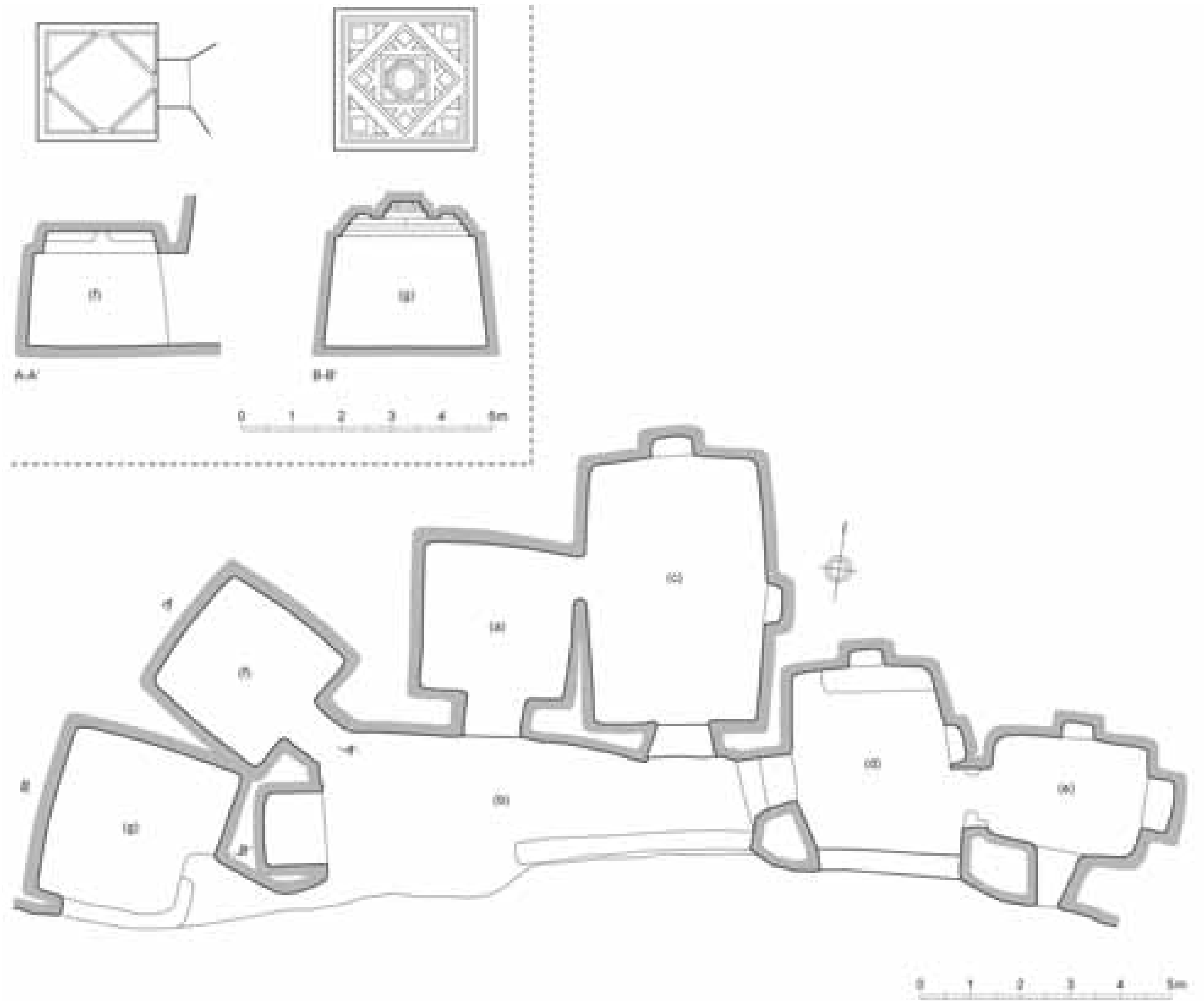


Figure 169 Caves F3: plan. Cave F3(f): section; ceiling. Cave F3(g): section; ceiling (after Kodera *et al*. 1971).

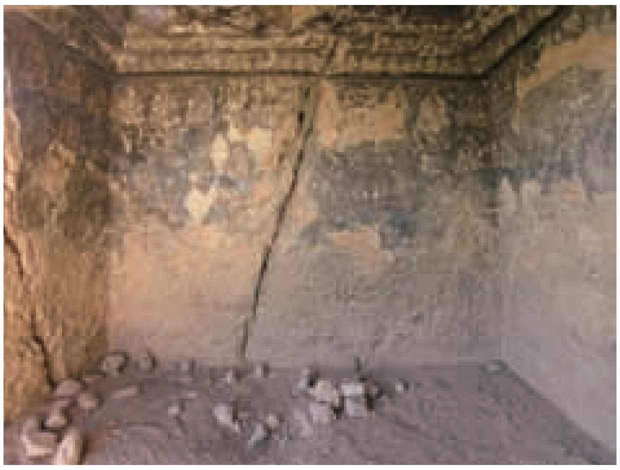


Figure 170 Cave F3(g): western side.

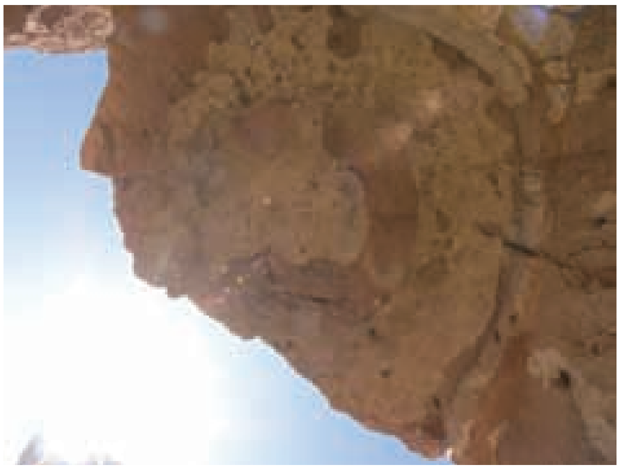


Figure 171 Cave F3(g): ceiling.

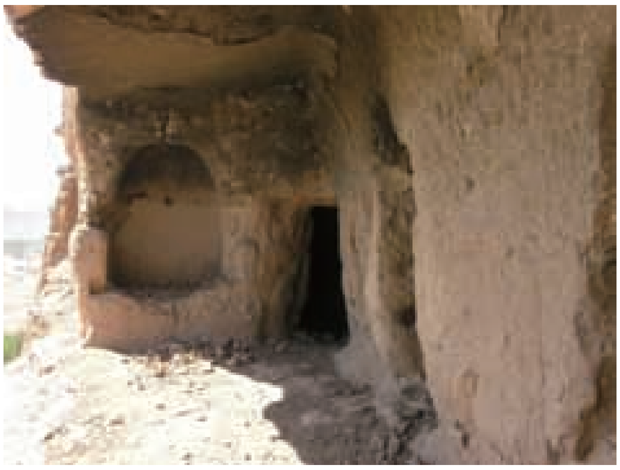


Figure 172 Cave F3(b), cave as a forecourt: western side.

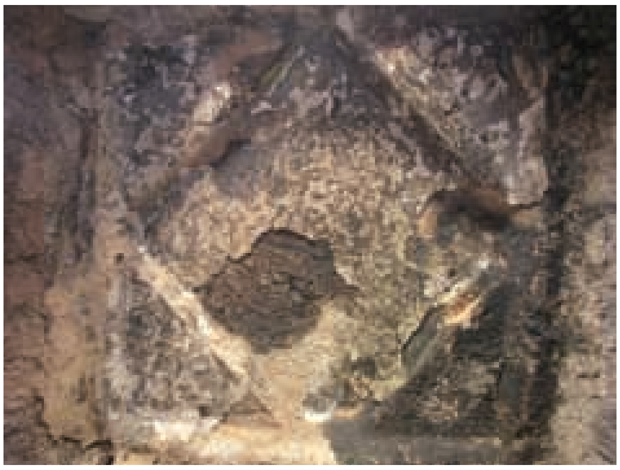


Figure 173 Cave F3(f): ceiling.

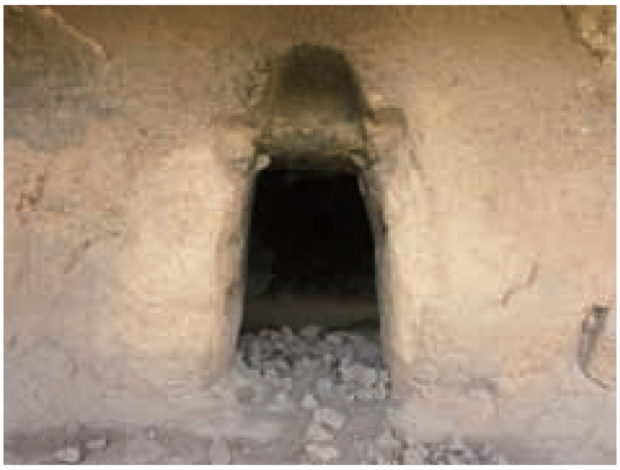


Figure 174 Cave F3(a): entrance.

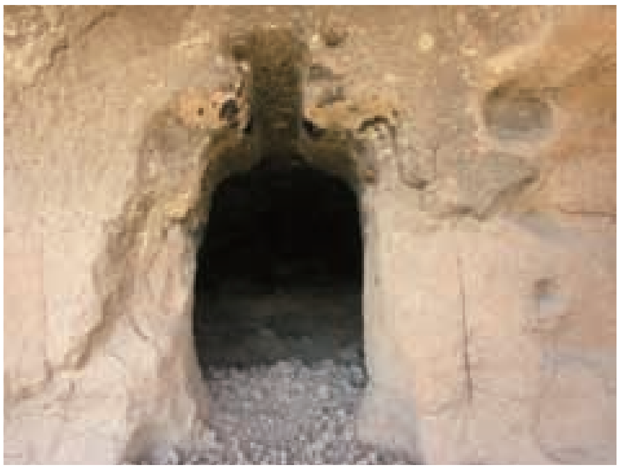


Figure 175 Cave F3(c): entrance.

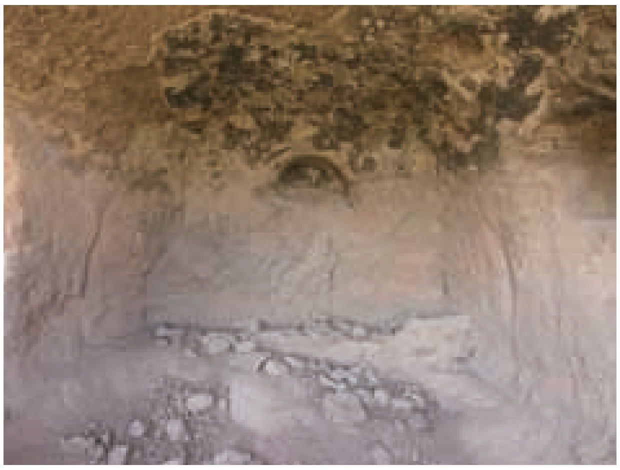


Figure 176 Cave F3(d): northern side.

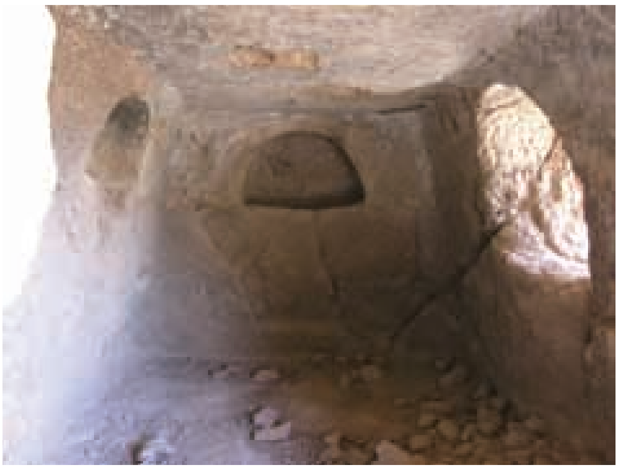


Figure 177 Cave F3(e): eastern side.

Cave M

Location: Cave M is west of Caves F3 and also below Cave L.

Form: Square plan; flat ceiling. Cave M has an almost square plan but expands slightly towards the back. At the foot of the western, northern and eastern walls, bench-style pedestals have been chiselled measuring 30–40cm deep.

Technique and design: While the construction of Cave M is simple, the interior of the cave is covered with mural paintings. The bench-style pedestals mentioned above are the smallest in depth and height of all the pedestals at the Bamiyan site. A fingerprint has been documented on the northern side wall (Fig. 182). This wall may well have been created in a later period and indicates that people daubed clay onto the walls with their bare hands. The doorframes still remain both inside and outside the entrance. It is

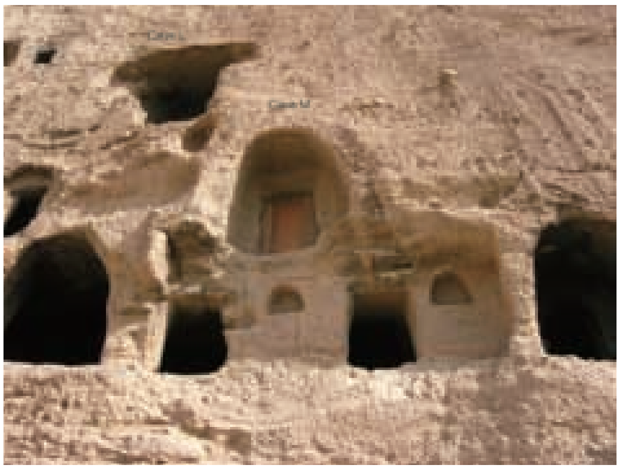


Figure 178 Cave M: façade.

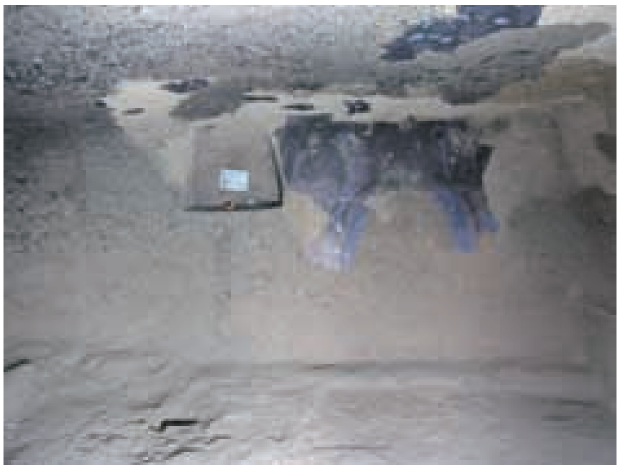


Figure 179 Cave M: northern side.

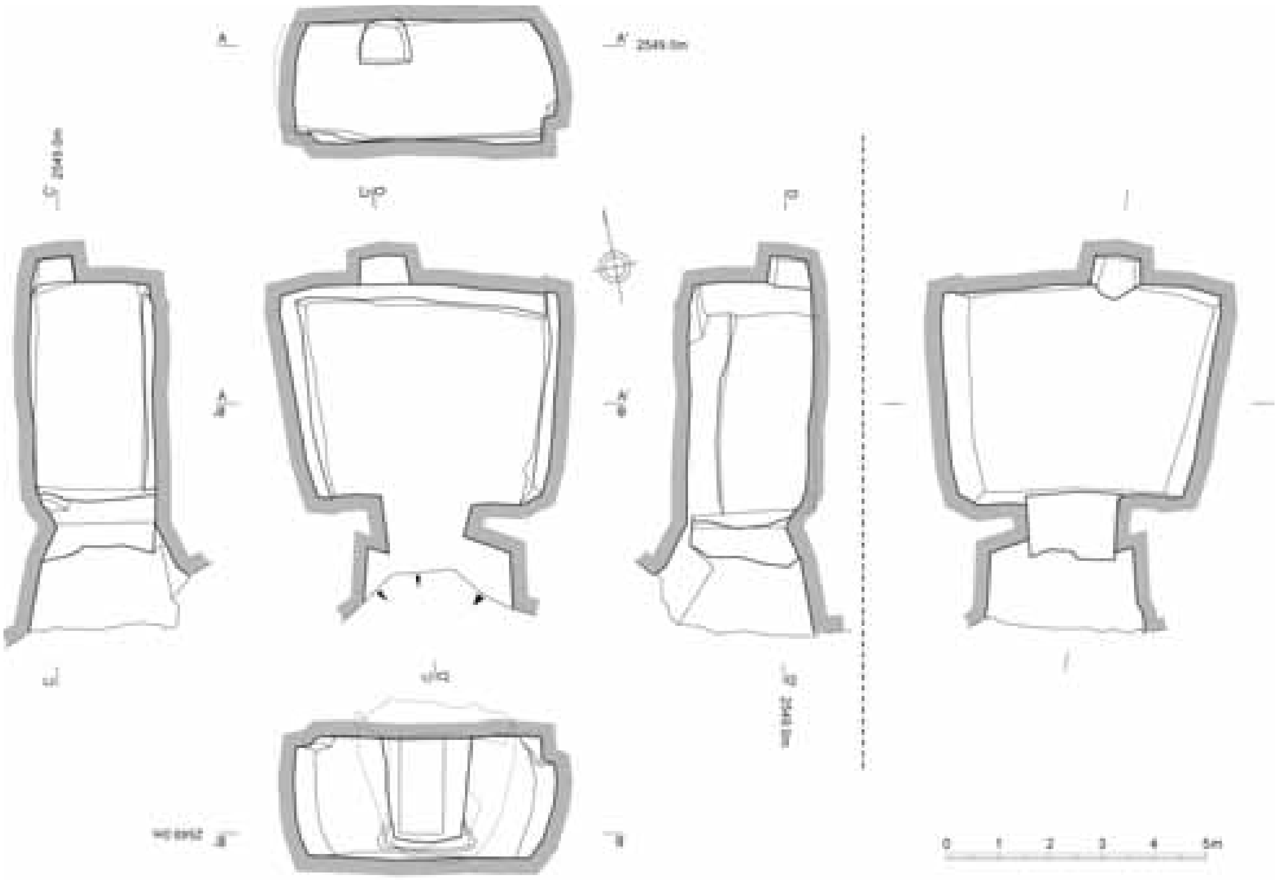


Figure 180 Cave M: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

interesting to investigate the relationship between Cave M and the surrounding caves. Two caves are located just under Cave M, sharing the cave's forecourt. They are very close to each other. There are boreholes on both sides of Cave M, which are probably remnants of a pathway or a front structure between the two caves under Cave M.

Present condition: It is unclear how to reach the cave as the floor in front of the entrance has collapsed. Cave M is closed in order to protect the mural paintings inside the cave. No cracks have been confirmed to date.

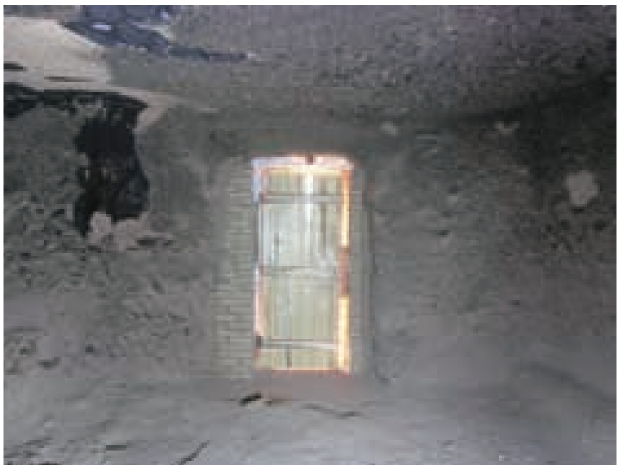


Figure 181 Cave M: southern side.

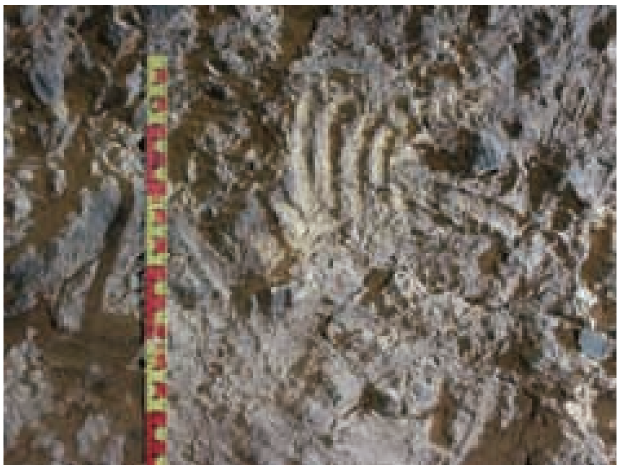


Figure 182 Cave M: fingerprint on clay wall.

Cave 118

Location: Cave 118 is located to the west of Cave M, and also below Cave L to the west. It is also situated above Caves 116 and 117. The opening section, numbered 115 by Kyoto University, is a high window in Cave 118 (Fig. 186). To the west of this opening section is a stairway to Cave L. Several caves and stairways are intricately arranged around this area. Furthermore, the southern cliff has collapsed and many changes to the cave were added in a later period. This situation makes it difficult to understand the original interrelation of these caves.

Form: Octagonal plan; domed ceiling; shallow tambour. Diameter: less than 6 m. Height: about 4.8 m.

Technique and design: The shape of the plan is uneven and the surfaces of the side walls are coarse. Portions of wall clay measuring ca. 30 mm in thickness remain on the surface of the walls. South of the dome is the opening section called Cave 115. This is a high window providing lighting or ventilation for Cave 118. Outside the window are traces of engravings for wooden frames (Fig. 183). It is inferred that this opening section had originally been an entrance, which was later converted into the high window when Cave 118 was constructed.

Present condition: The lower part of Cave 118 was changed significantly, leaving the original approach to Cave 118 unknown. There are some indications that the cave was used as a residence, including the black soot and a hole in the floor with a diameter of 115 cm.

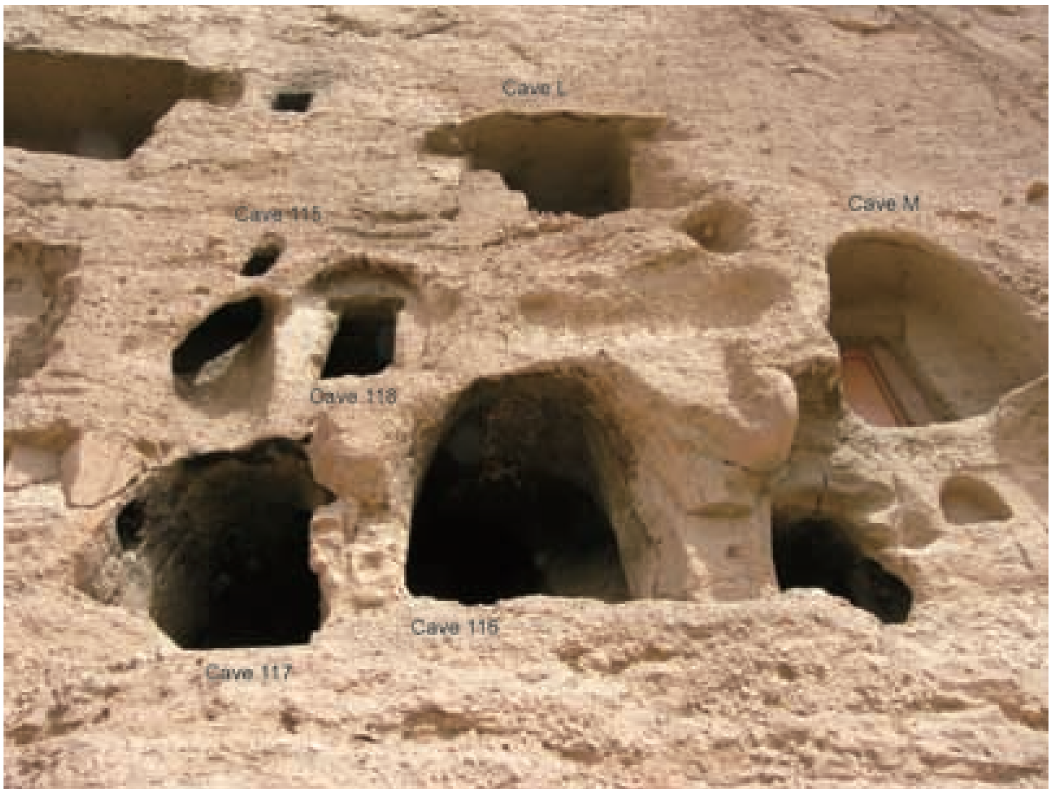


Figure 183 Cave 118: façade.

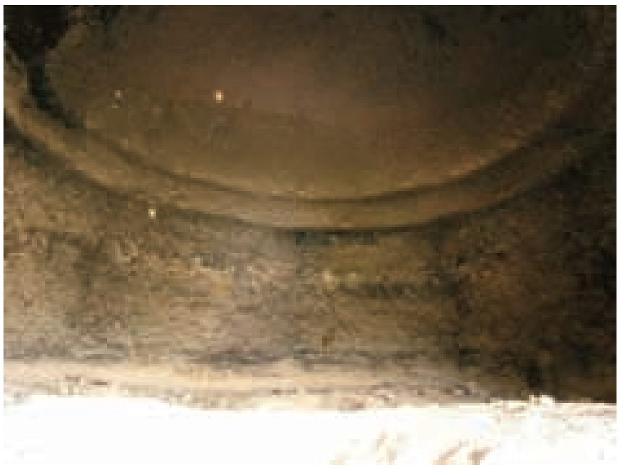


Figure 184 Cave 118: northern side.

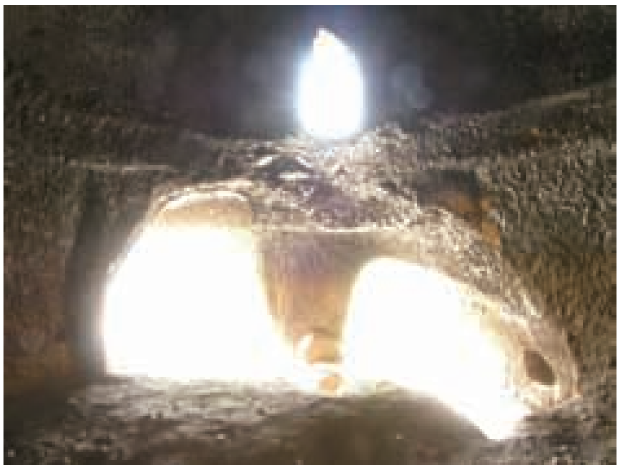


Figure 186 Cave 118: southern side.

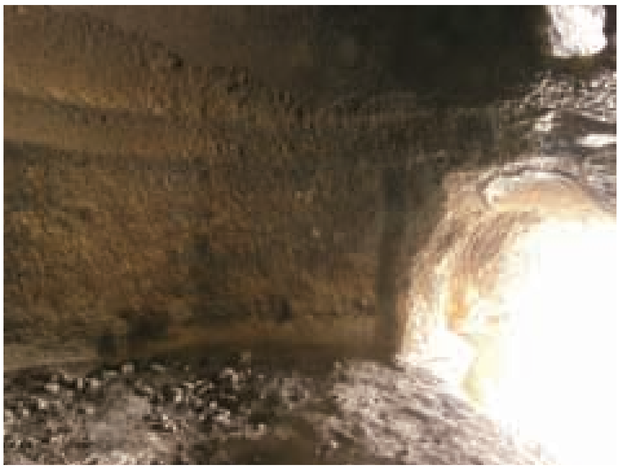


Figure 185 Cave 118: eastern side.

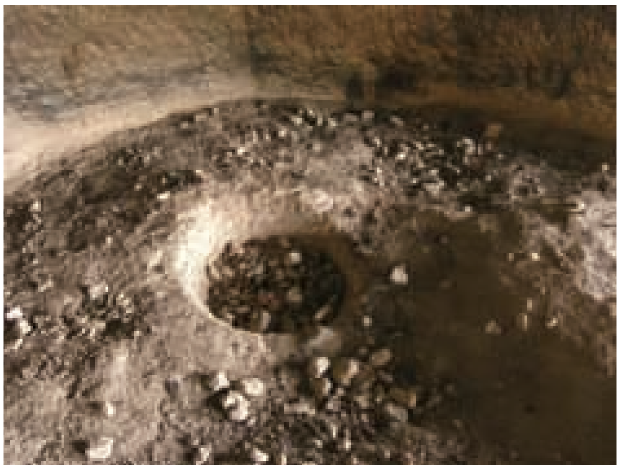


Figure 187 Cave 118: floor.

Cave L

Location: Cave L is on the upper western side of Cave M. The stairway exposing its section to the west of Cave 118 leads up towards the forecourt of Cave L.

Form: Octagonal plan; *laternen-decke*; polygonal tambour. Diameter: ca. 5.4 m. Height: ca. 4.6 m.

Technique and design: The niches on each side wall are independent and show no traces of pilasters. On the back wall of the niches are mortises arranged at regular intervals. Only the niches on both sides of the entrance contain a pedestal for a statue (Fig. 196). Hints of colours such as white, blue and red can be seen through the layer of black soot on the side walls. No traces of three-dimensional decorations such as reliefs have been documented. The three-dimensional parts of the niches, the cornice and the *laternen-decke* have a smooth finish, and their corners are defined. On the southern side is a large entrance, outside of which there is a wooden frame, or possibly traces of devices for a lintel and a threshold (Fig. 197).

The forecourt is characteristically aligned vertically, measuring ca. 4 m wide and ca. 5.4 m high. A ledge around the walls of the upper part of the forecourt has a depth of ca. 40 cm. The upper surface of the ledge is engraved with two channels measuring ca. 22 cm deep and extending east, north and west. In addition, there are channels at both corners with an angle of 45 degrees (Fig. 198). These channels are all on the same level. Due to the fact that there are no receptors for timbers on the back of the channels, it is unlikely that they held long cantilever beams. It is assumed that the ledge used to cover half of the forecourt and was supported by stilts in order to extend the ledge (Fig. 190).

Present condition: There are numerous indications that this cave was used as a residence in a later period, including the low partitions for compartments and the black soot on the walls and ceiling. Nevertheless, wall clay and mural paintings are confirmed on the walls and the ceiling, and no changes to the structure or cracks have been documented.

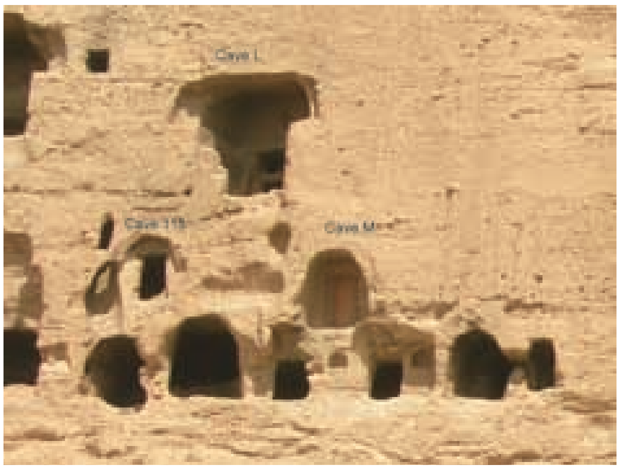


Figure 188 Cave L: façade.

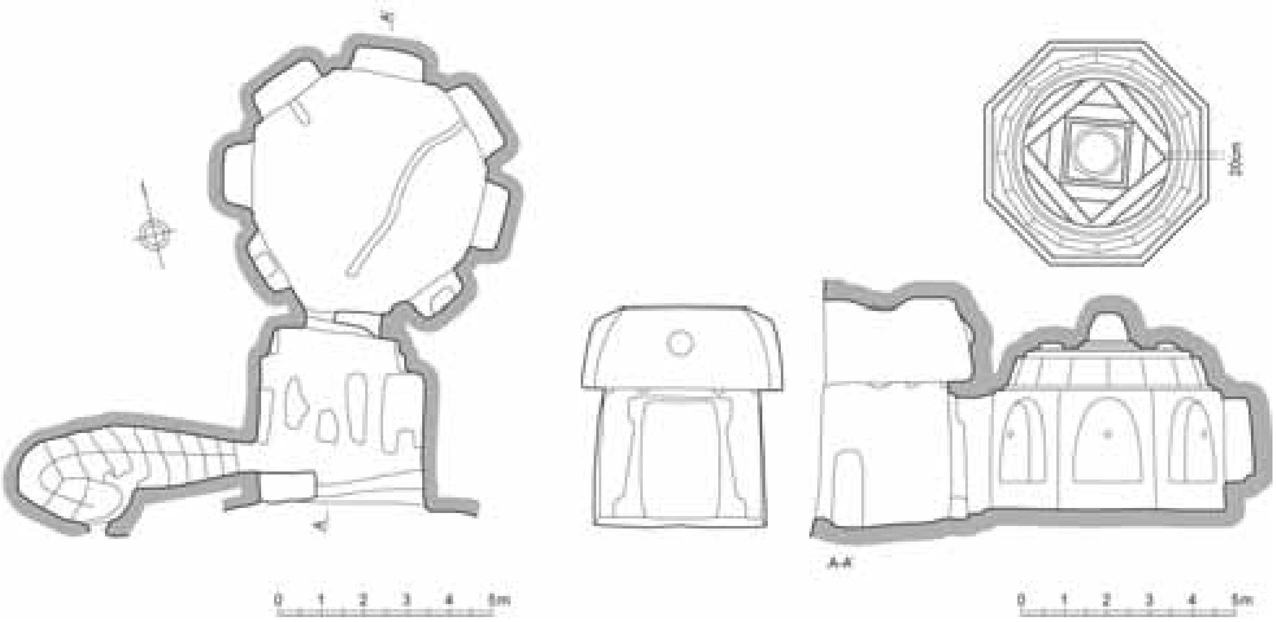


Figure 189 Cave L: plan; elevation of the forecourt; section; ceiling (after Kodera *et al.* 1971).

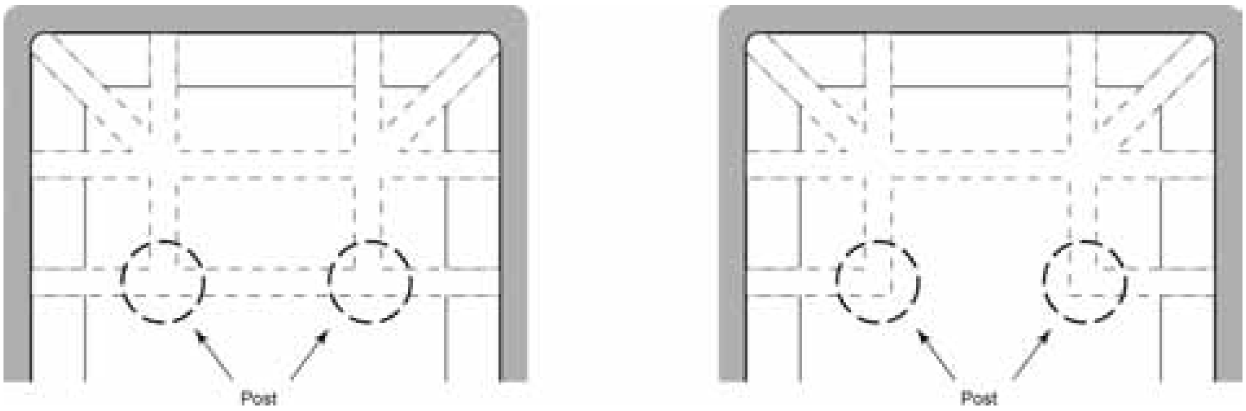


Figure 190 Cave L: two types of reconstruction for the wooden structure at the upper part of forecourt.

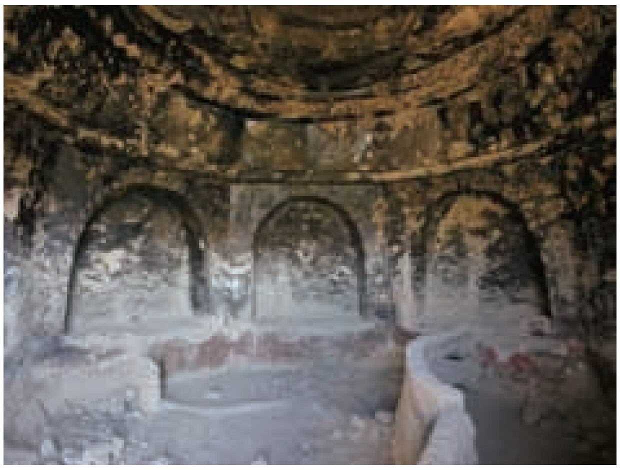


Figure 191 Cave L: northern side.

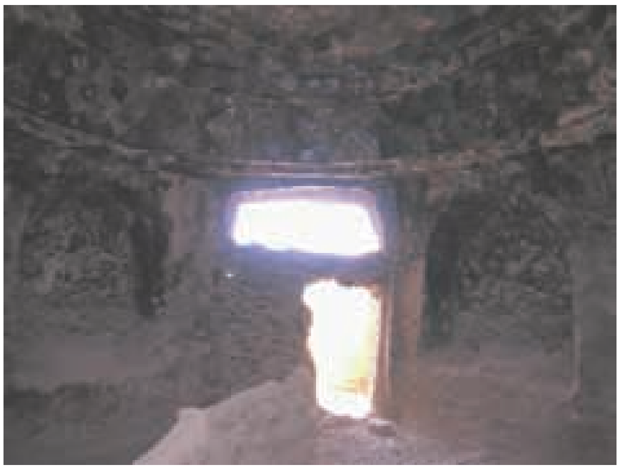


Figure 193 Cave L: southern side.

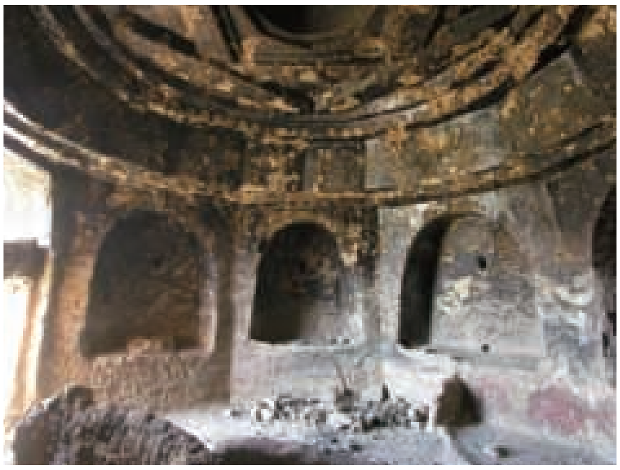


Figure 192 Cave L: western side.

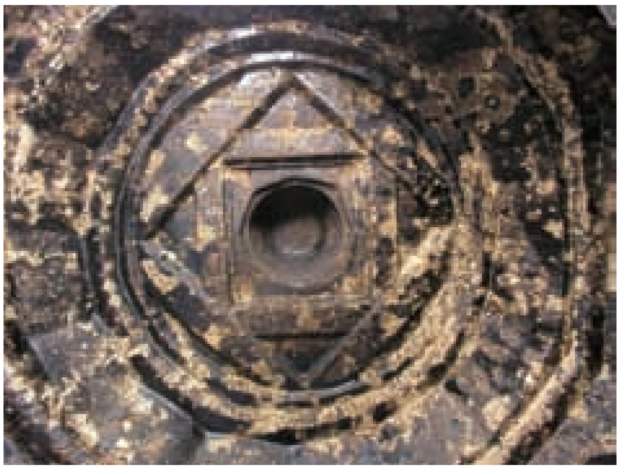


Figure 194 Cave L: ceiling.

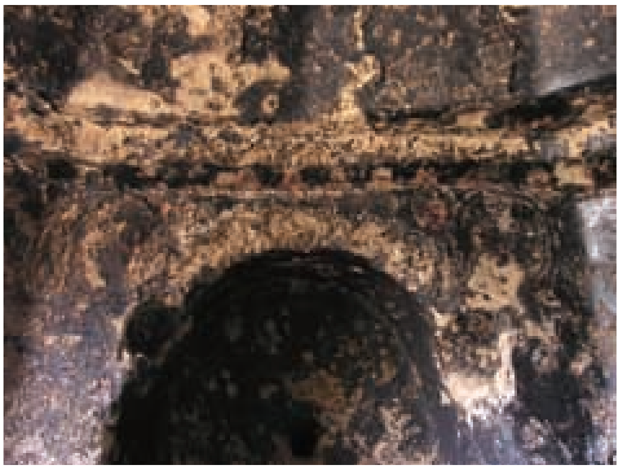


Figure 195 Cave L: cornice.

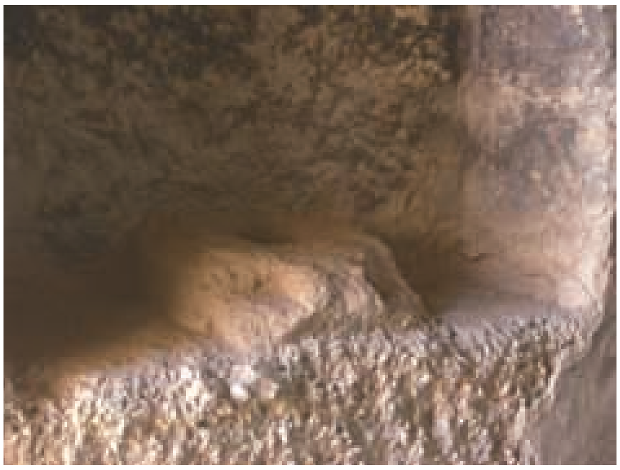


Figure 196 Cave L: pedestal in the niche.

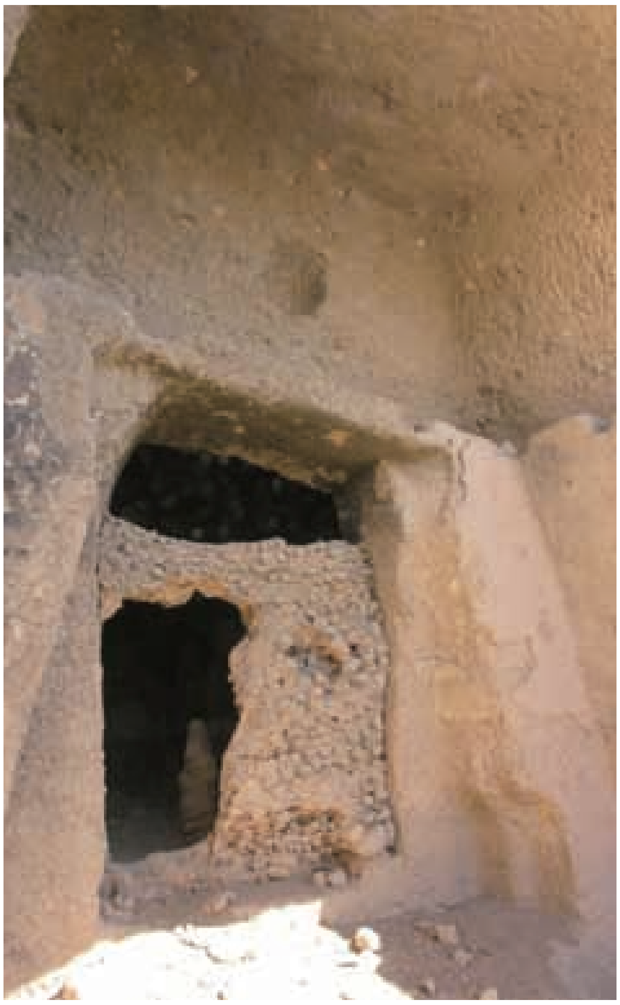


Figure 197 Cave L: entrance.

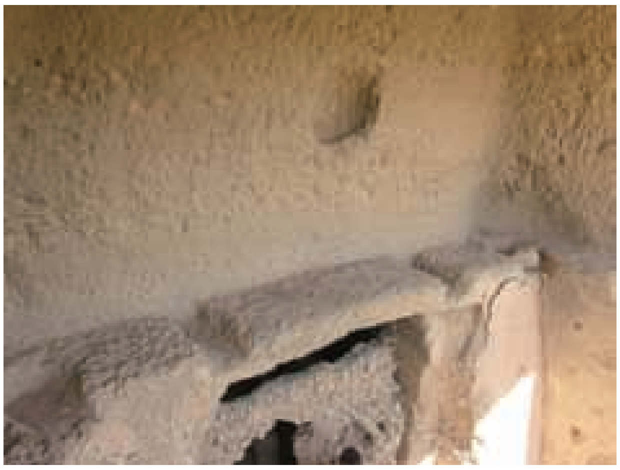


Figure 198 Cave L: upper part of the entrance (from the forecourt).

Cave A Upper (a)

Location: Cave A Upper (a) is at the centre of Caves A Upper and situated to the west of Cave L. Cave A Upper (a) is located at the back of Cave A Upper (b), which serves as its forecourt.
Form: Octagonal plan; *laternen-decke*; tambour. The *laternen-decke* is engraved on the hexadecagonal tambour. The side walls incline. The lower halves of the seven side walls, except for the entrance, are shallowly scraped with a curved shape. The inclination angle of the tambour is steeper than that of the side walls. It is elevated at a point slightly in front of the second corbel. The *laternen-decke* is constructed above the tambour through the two round corbels. Of these two corbels, the second one is more of a ceiling beam than an actual corbel.
Technique and design: On the face of the tambour there are several mortises possibly used to hold a statue in place. The mortises are not observed on all 16 walls of the tambour, which means that the statues must have been situated only at important points. The *laternen-decke* consists of two joists. They are not attached to the ceiling beam but engraved as if placed on the middle of the beam. In the centre of the ceiling is a small dome. The diameter of the lower side of this dome is slightly less than the inside measurement of the ceiling's second joist. While this small dome retains layers of wall clay and overcoat, the whole cave is covered with black soot.

The corridor on the western side of Cave A Upper (b) (the forecourt shared by Cave A Upper (a) and Cave A Upper (c)), connects to Cave A Upper (d) and Cave A Upper (e), to the west of Cave A Upper (b). A thick ledge protrudes from the northern wall of the forecourt, particularly above the entrance to Cave A Upper (a) (Fig. 205).

It is noteworthy that the niche at the centre of the side surface of this ledge has a trefoil shape (Fig. 206). It is reasonable to suggest that the mortise at the centre of the niche's back wall must have been used to support a statue fixed in this niche. While the bedrock surrounding this forecourt is now entirely exposed, the layers of wall clay and top coat remain inside the niche. In addition, evidence was found of the existence of part of the decoration created by modelling. There is a large mortise to the east of the niche, and, judging from the existing surface, its counterpart should be to the west, although the damage in that area makes this difficult to prove. These rich decorations in the forecourt indicate that Cave Upper (a) is in a highly significant position among the neighbouring caves.
Present condition: The floor, side walls and entrance are finished with sand plaster or mortar, which clearly shows that the restoration work was executed recently. As for the tambour, while the second corbel has no clear edge, the first holds it in the lower part. However, this has been caused by the restoration that occurred when the walls were repaired, and does not represent the original shape. The ceiling, including the ceiling beams, evidences the work of recent restoration projects. The entrance on the southern side is a slightly flat arc, and its top is cut out in a raised square shape. As this area was recently repaired, it is not clear if the forms convey the original plans. Wall clay partially remains on the walls of the forecourt. Immediate conservation work is necessary for this section because weathering could easily cause the top layer to deteriorate.

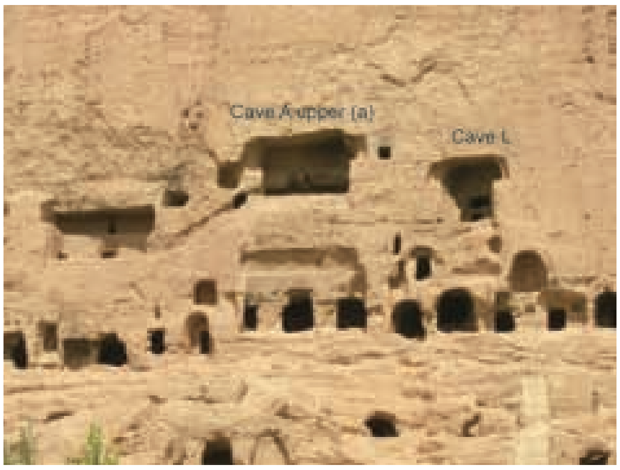


Figure 199 Cave A Upper (a): façade.

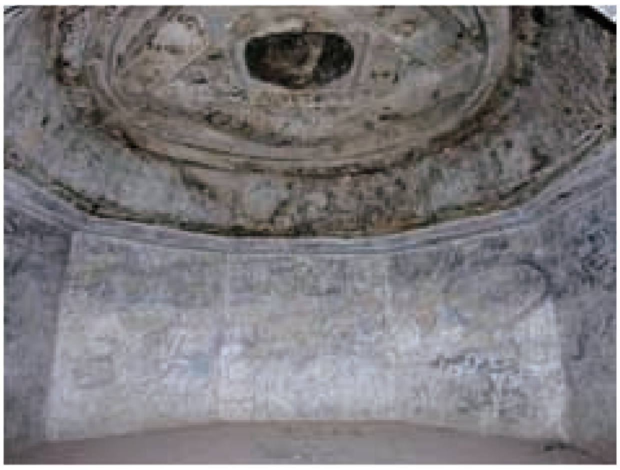


Figure 200 Cave A Upper (a): northern side.

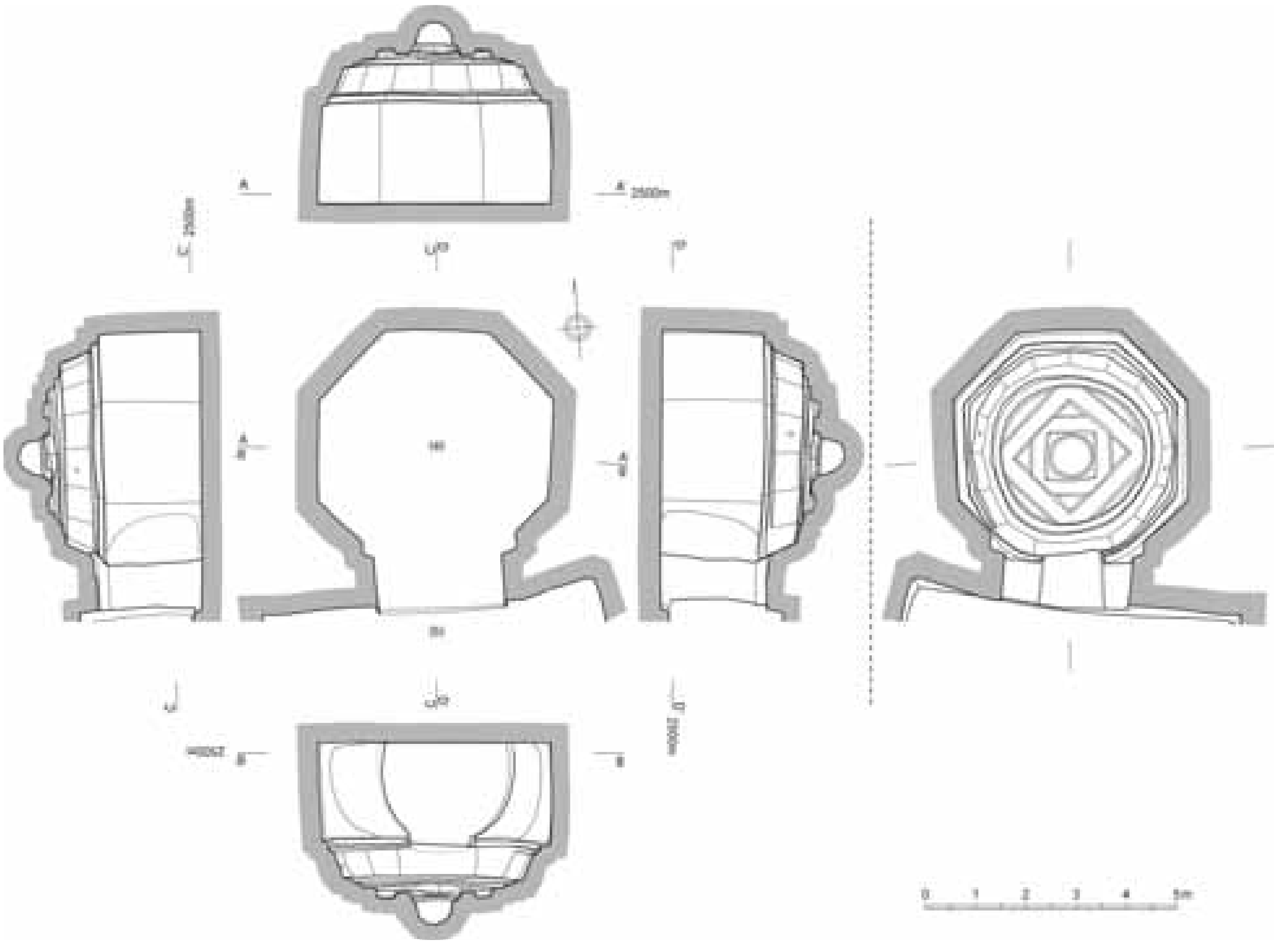


Figure 201 Cave A Upper (a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

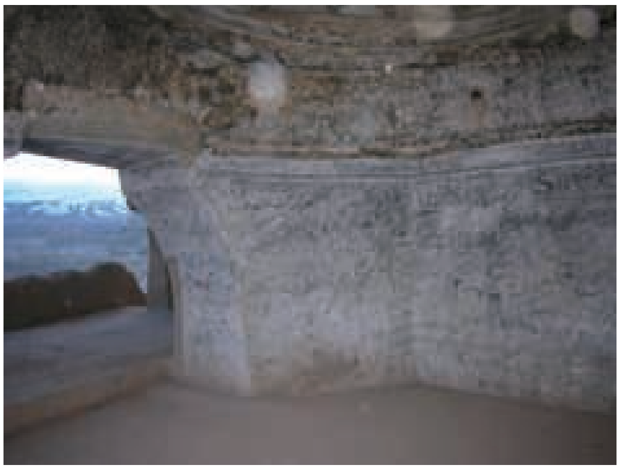


Figure 202 Cave A Upper (a): southwest side.

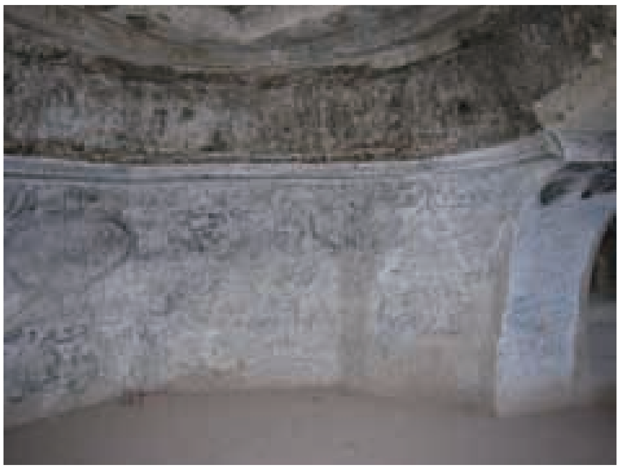


Figure 203 Cave A Upper (a): eastern side.

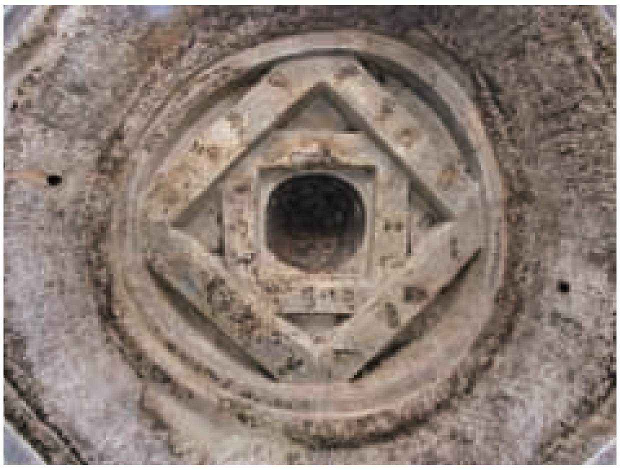


Figure 204 Cave A Upper (a): ceiling.

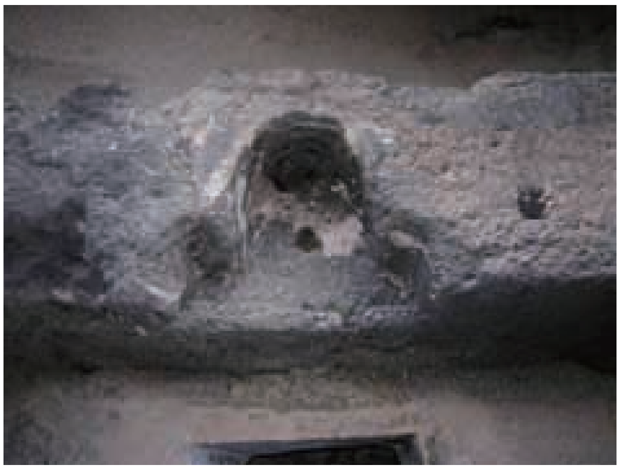


Figure 206 Cave A Upper (a): niche above the entrance.

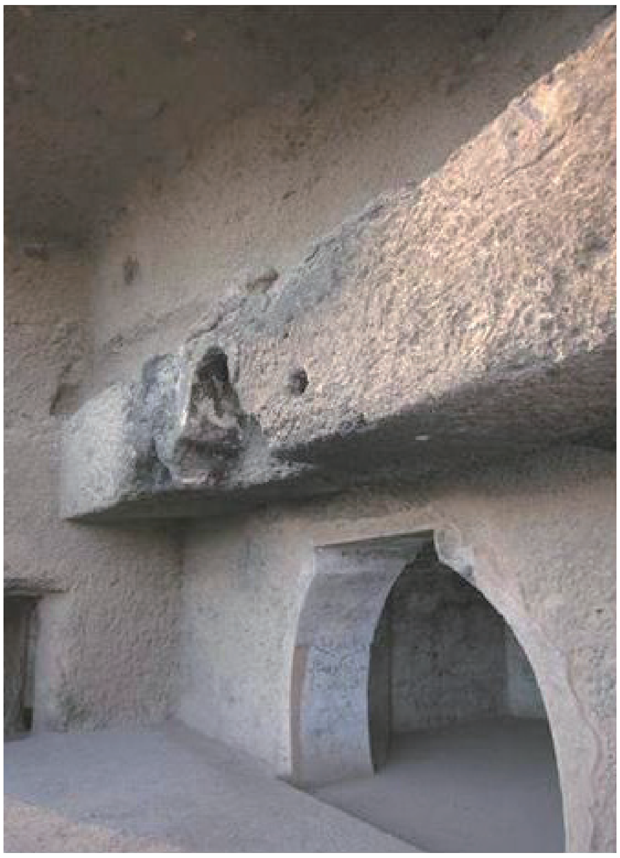


Figure 205 Cave A Upper (a): northern side of the forecourt.

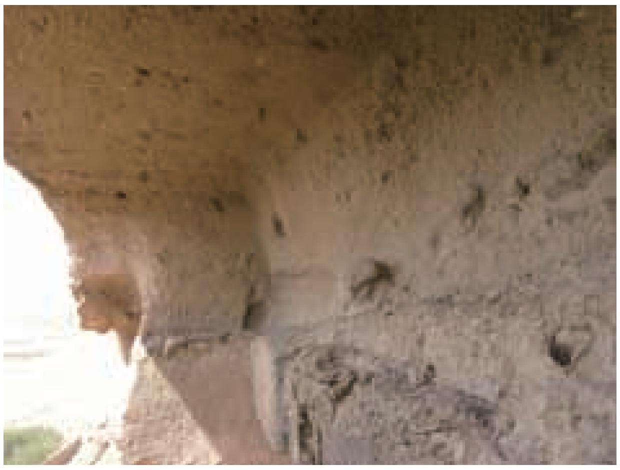


Figure 207 Cave A Upper (a): upper part of the forecourt.

Cave A Upper (c)

Location: Caves A Upper nestle to the west of Cave L along the cliff. This cave cluster consists of Cave A Upper (a), Cave A Upper (c), Cave A Upper (b) as a forecourt, Cave A Upper (d) and Cave A Upper (e). Cave A Upper (a) and Cave A Upper (c) have centred plans and share Cave A Upper (b) as their forecourt. Cave A Upper (d) and Cave A Upper (e) were constructed with the oblong plan.
Form: Square plan; domed ceiling; tambour. Cave A Upper (a) and Cave A Upper (c) share Cave A Upper (b) as a forecourt. The first cornice is round, and four re-entrant angles of the side walls keep the base in the shape of a triangle. There is a corbel on the tambour over which a deep dome is engraved.
Technique and design: The side walls each feature long vertical niches. The northern and southern walls each have four niches. On the western side, there is a niche on each side of the entrance. The eastern wall has three niches, the centre niche of which is wider and deeper than the other two. A bench-style pedestal is engraved along the walls, including the niches. The niches become higher at their centre, presumably functioning as a plinth on which a statue could be installed. The pedestal in the central niche on the eastern side is different from the others because this bench-style pedestal ends before reaching both sides of the central niche. In addition, the plinth of the central niche is higher than the others. The fact that this niche is wider than the others, with a higher plinth, means that this niche is not as elongated. It is thus assumed that only the central niche on the eastern side contained a seated statue.

The side walls are now entirely damaged. Presumably the niches on the side walls were originally arcaded by semicircular arches supported by long pilasters (Fig. 217). Some remaining parts of the hems indicate that they were decorated by modelling. On the back of the niches there are mortises designed to hold statues. As with the side walls, the tambour has niches that were arcaded by semicircular arches supported by long pilasters (Figs 215, 216). Judging from the broken pieces, the pilasters were created by modelling. The arches surely held the hems; however, their forms are unclear due to the clay wall that was recoated in a later period. On the back of the niches there are mortises, indicating that the statues were situated inside these niches. It therefore can be deduced that the niches were created on the side walls in order to install the statues inside, and that the centre of the eastern wall was the front of the cave. The niches on the tambour would have been serially arcaded and the statues installed inside.

This cave seemingly has no geometric accuracy or planning in terms of form and design. It therefore looks very rough. However, it should be noted that the arch hem of the remaining tambour and the pilasters with capital ornaments are in fact equipped with elaborate decorations created by modelling. Moreover, possible arabesque designs created by modelling have been partially documented. While the work done to hew out the cave from the bedrock was inferior, the finishing works with wall clay must have been elaborate. This cave is an example of an advanced clay modelling technique at the Bamiyan site. Unfortunately, however, this exceptional modelling was damaged by later processes of recoating with wall clay.
Present condition: The whole surface is covered with black soot and a footprint has been found even on the ceiling. There are no particular cracks inside the cave, but a long vertical crack runs down the right upper part of the entrance's exterior, reaching the upper edge of the ledge that protrudes into the forecourt (Fig. 218).

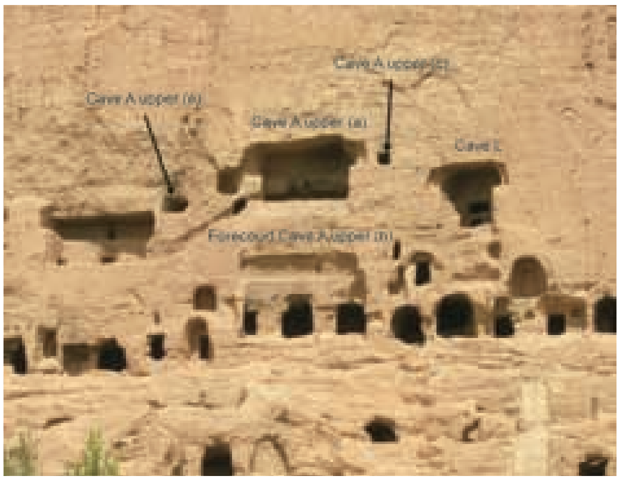


Figure 208 Cave A Upper (c): façade.

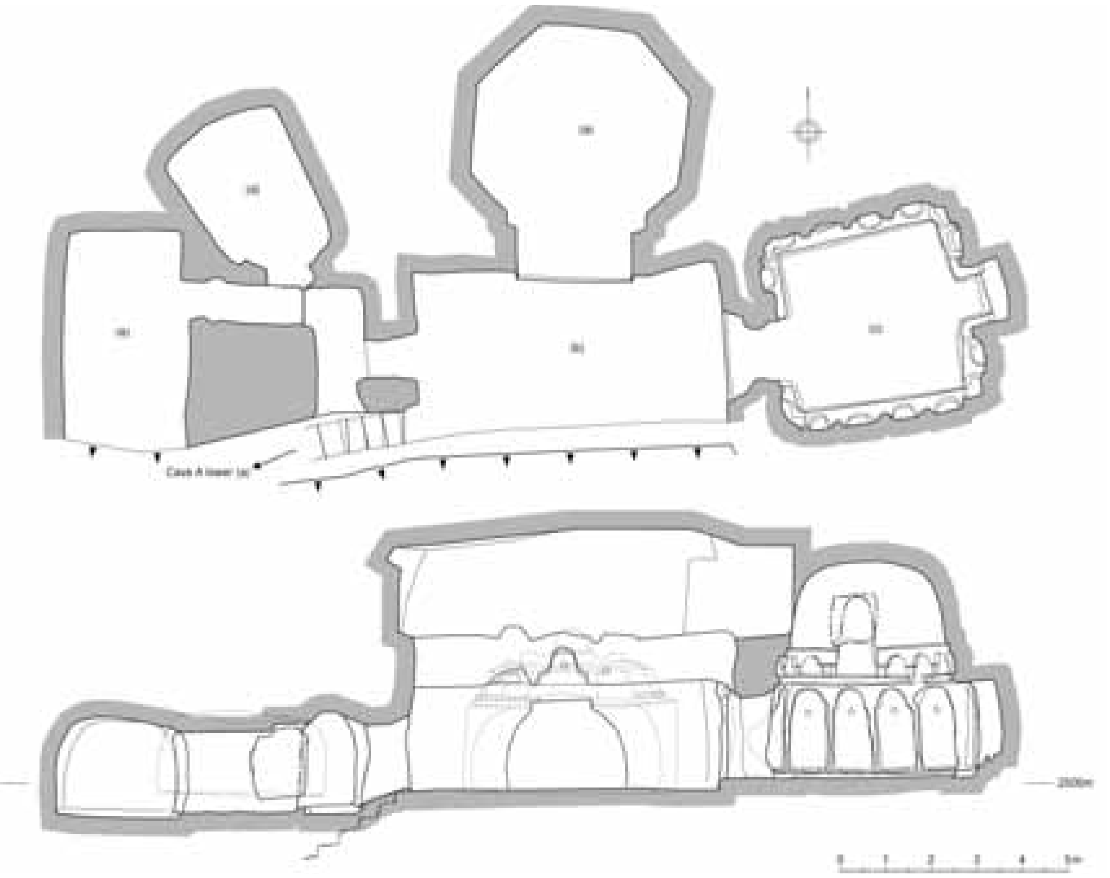


Figure 209 Caves A Upper: plan; section (measured by PASCO Corporation, Japan, in 2007).

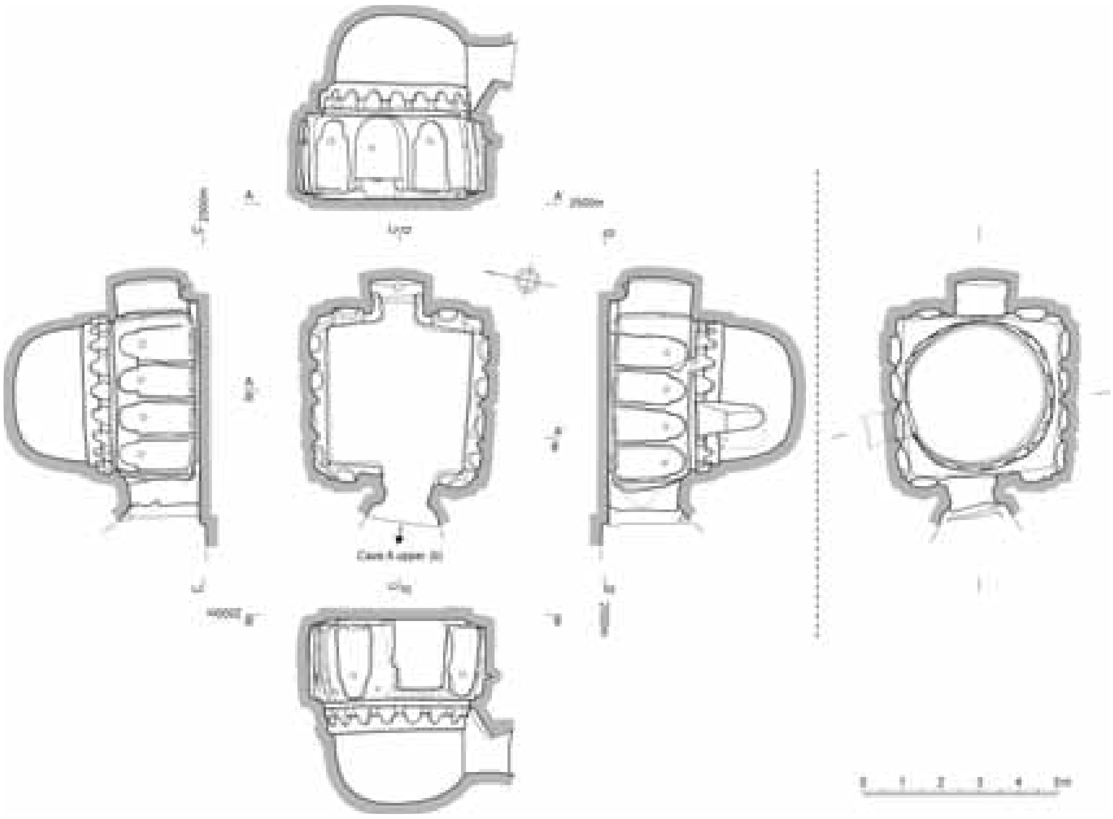


Figure 210 Cave A Upper (c): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

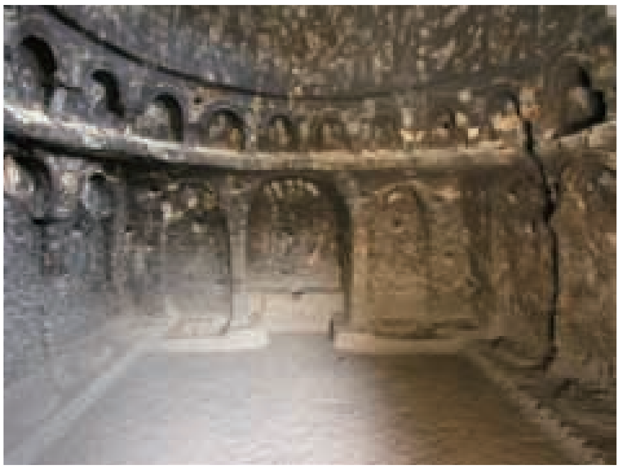


Figure 211 Cave A Upper (c): eastern side.

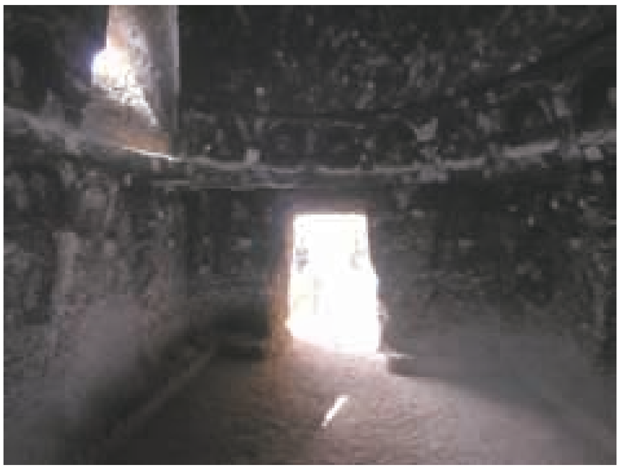


Figure 214 Cave A Upper (c): western side.

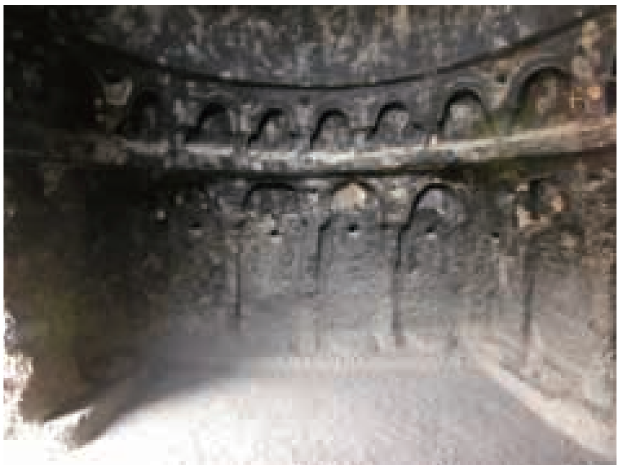


Figure 212 Cave A Upper (c): northern side.

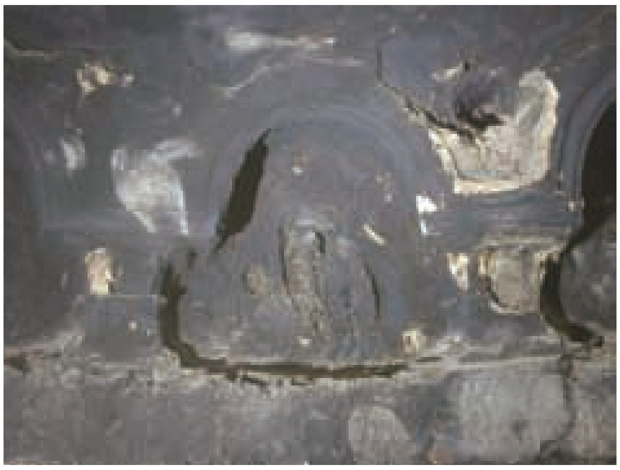


Figure 215 Cave A Upper (c): niche on the tambour.

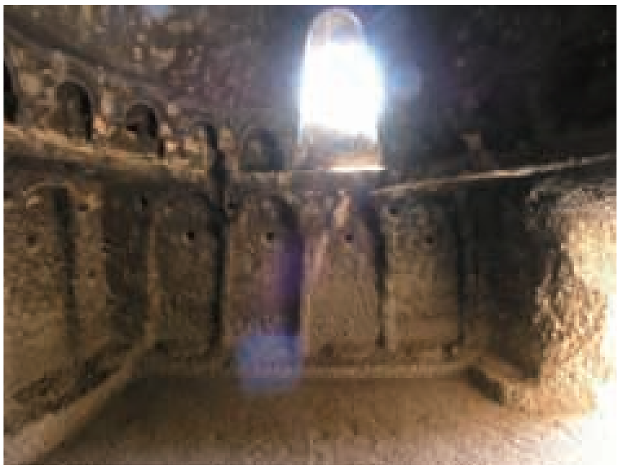


Figure 213 Cave A Upper (c): southern side.

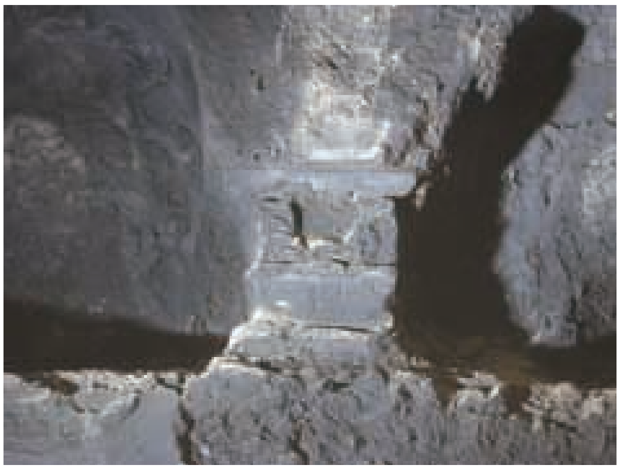


Figure 216 Cave A Upper (c): pilaster on the tambour.

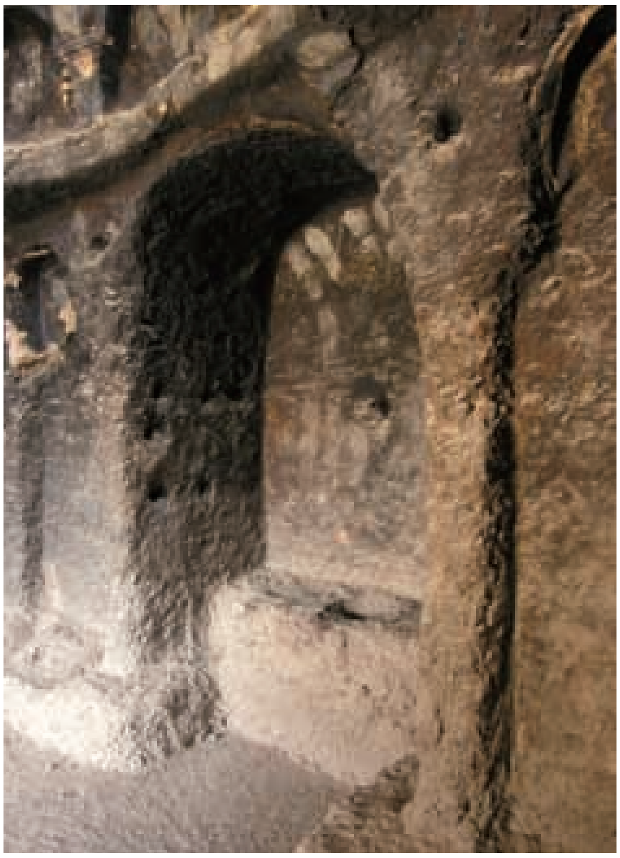


Figure 217 Cave A Upper (c): niche on side wall.

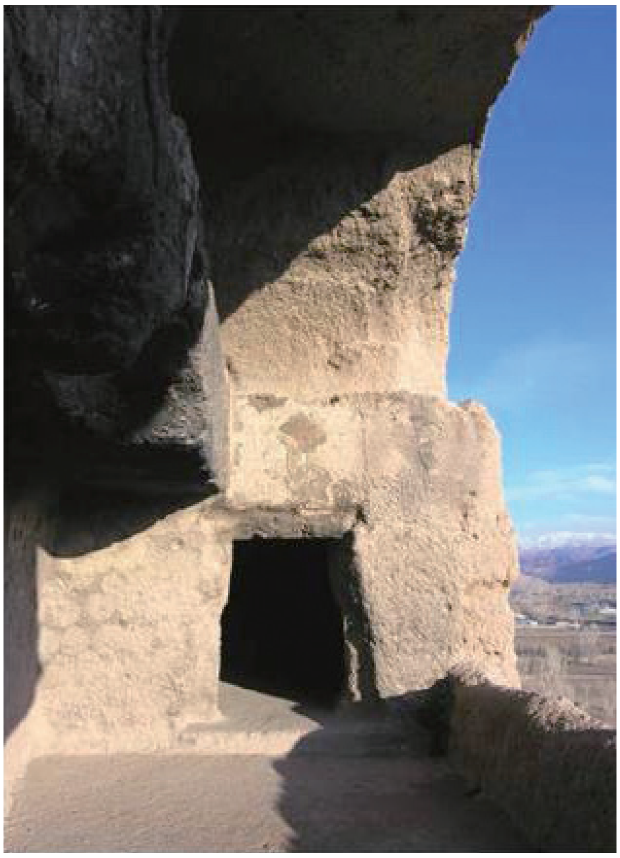


Figure 218 Cave A Upper (c): entrance.

Cave 123

Location: Cave 123 is located to the east of the East Giant Buddha, below Caves A Upper.
Form: Square plan; *laternen-decke* with a stave. Cave 123 shares a forecourt on its southern side with Cave 124, the neighbouring cave.
Present condition: The southern side of the forecourt has collapsed. The western and southern sides of the cave are also fully destroyed. Black soot remains on the side walls and the ceiling, indicating that this cave was used as a residence.

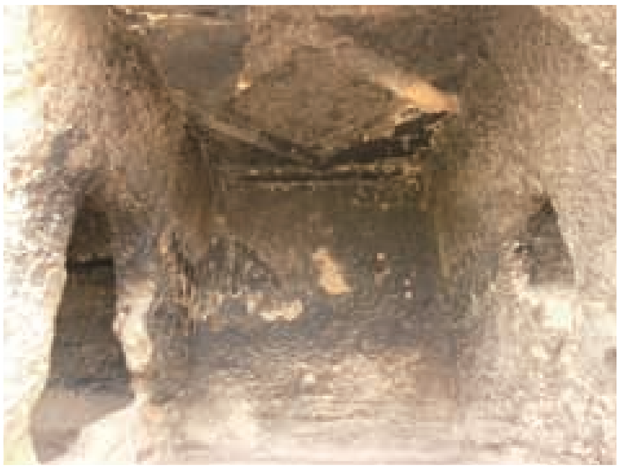


Figure 221 Cave 123: northern side.

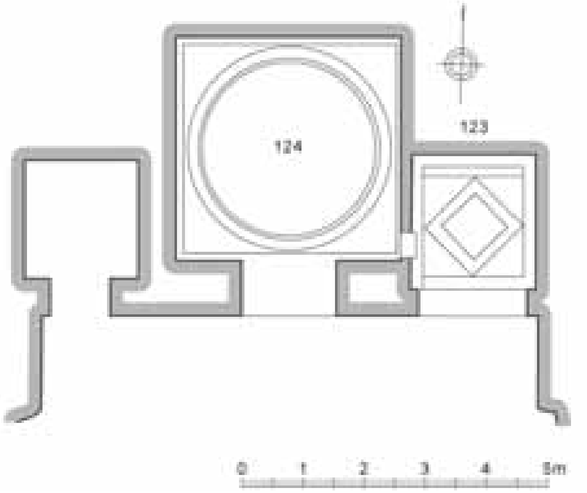


Figure 219 Cave 123: plan (after Kodera *et al.* 1971).

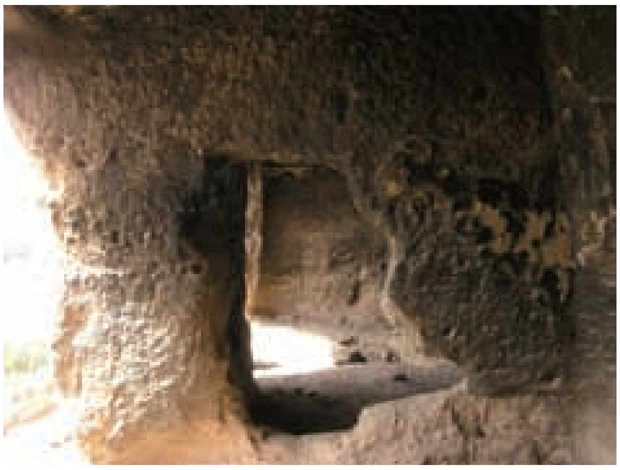


Figure 222 Cave 123: western side.

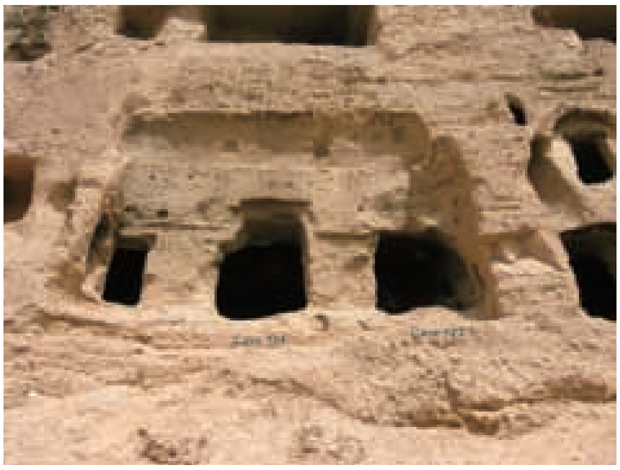


Figure 220 Cave 123: façade.

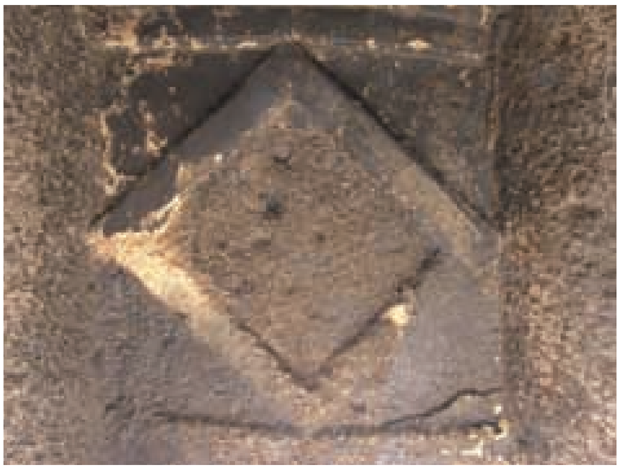


Figure 223 Cave 123: ceiling.

Cave 124

Location: Cave 124 is located to the east of the East Giant Buddha and below Caves A Upper. This cave stands to the west of Cave 123.

Form: Square plan; domed ceiling. There is no transitional section between the wall and the dome. There is a triangular base between each re-entrant angle of the side walls and the domed ceiling. Cave 124 shares a forecourt on the southern side with Cave 123.

Present condition: The southern side of the forecourt has deteriorated. There have been some more recent changes, such as the entrance to Cave 123 on the eastern side. Black soot indicates that this cave was used as a residence.

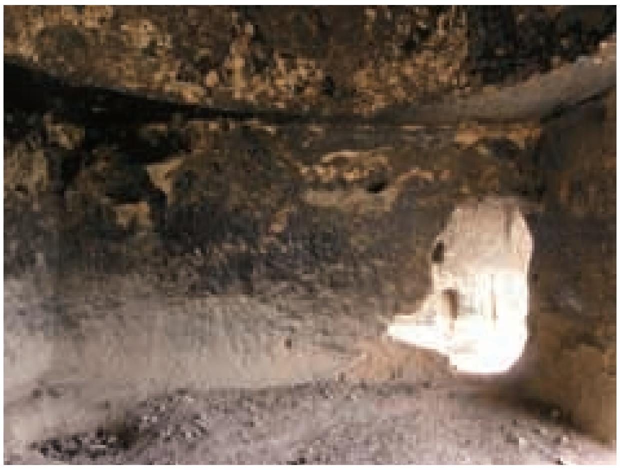


Figure 226 Cave 124: eastern side.

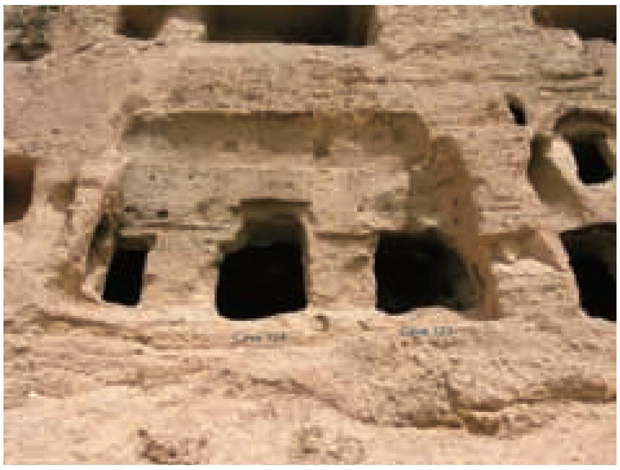


Figure 224 Cave 124: façade.

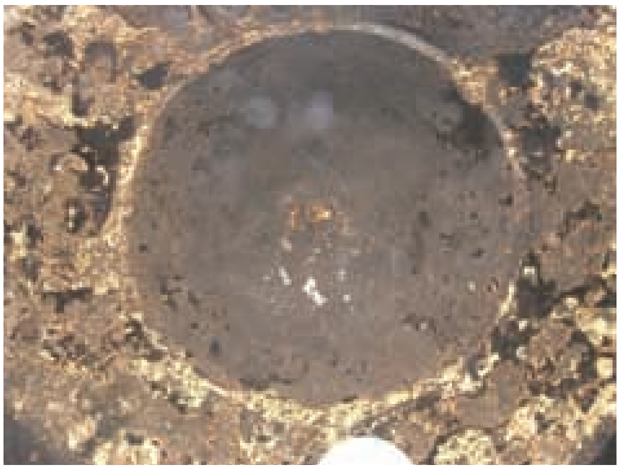


Figure 227 Cave 124: ceiling.

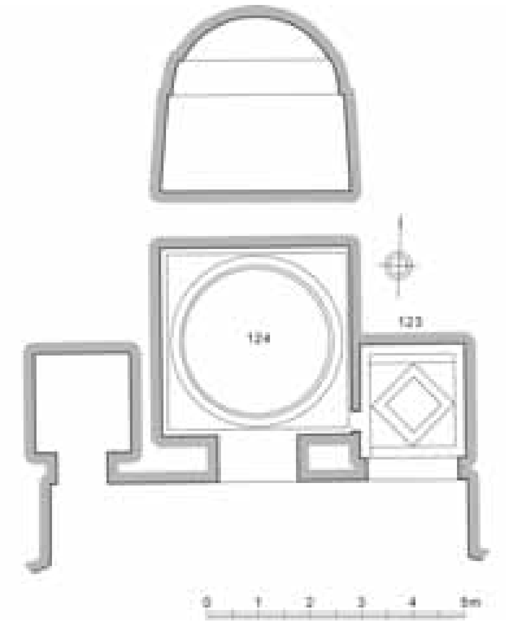


Figure 225 Cave 124: plan; section (after Kodera *et al.* 1971).

Cave A Lower (a)

Location: Caves A Lower are situated a little to the west and below Caves A Upper, and also to the east of the East Giant Buddha. This cluster consists of Cave A Lower (a) and Cave A Lower (b), both of which have square plans. The step corridor from the eastern side of the forecourt reaches the entrance on the lower part of the cliff. Caves B are just west of Caves A Lower. The southwest side wall of Cave Lower A (b) was partially demolished to create the gateway to Caves B.

Form: Square plan; domed ceiling; tambour; squinch. The domed ceiling is engraved on the tambour and partitioned by corbels without a cornice on the tops of the side walls.

Technique and design: Bench-style pedestals are engraved along the side walls. The pedestal on the northern side, at the front of the cave, is larger than the others, measuring 65 cm in height and ca. 100–130 cm in depth. The other pedestals, on the eastern, western and southern sides, are 30 cm high, and ca. 45 cm deep. While the west end of the northern pedestal reaches the western side wall, the east end stops short of the eastern side wall to allow the eastern pedestal to extend to the northern side wall. The plan of Cave A Lower (a) is different from that of Cave B(a) (discussed below) even though the two caves have similar schemes.

On the eastern, southern and western walls are several evenly aligned mortises designed to hold statues on the upper and middle part of the corresponding side walls. The location and number of mortises depended on the size of the pedestals. On the eastern side wall there are five pairs, on the western there are four pairs, and on the southern side there is one pair on each side of the entrance. These mortises are all approximately 11–13 cm in diameter and 15–30 cm in depth. Some still have tenons inside. It is deduced from the height of the mortises that standing statues were installed on the pedestals along the side walls. However, no mortises aligned in this way were found on the northern side wall (Fig. 231). Judging from the depth of the pedestal and the ratio of the height of the pedestal to that of the wall, it is assumed that a seated statue was fitted on the pedestal on the northern wall. As the seated statue is more stable on the wider pedestal, compared with the standing statue, mortises were not necessary for the northern wall.

The tambour is horizontally corbelled from the top of the side walls, creating the squinches with sextuple arches at their four corners (Fig. 235). Both squinches on the northern wall are flat and geometrically inaccurate on the curve compared with those of the southern side wall. The domed ceiling is raised above the corbelled point of the tambour.

Based on the fallen mural paintings, the chronology of the mural paintings has become clear. First, the bedrock was covered entirely with coarse wall clay mixed with vegetable chaff temper. It was then finished with a top layer and the base coating was carried out. Finally, the mural paintings themselves were added.

A hollow opening for a doorframe remains on the outside of the entrance. It is therefore plausible to reconstruct Cave A Lower (a) in the following fashion. The cave has bench-style pedestals along the side walls. On the northern pedestal, functioning as the front pedestal, several seated statues were installed. Five standing statues were situated on the eastern pedestal and four on the western pedestal. The southern side used to have one standing statue on each side of the entrance. The mural paintings were drawn on the side walls, tambour and over the entire ceiling. The forecourt of this cave is wide open in the front due to the collapse of the bedrock. The side walls retain coloured layers, which indicate that this forecourt used to have mural paintings along with Cave A Lower (a).

It is unclear if the mortises aligned irregularly on the side walls were used to support the statues. On the top of the side walls are some large rectangular hollows, the shape and size of which suggest that wooden joists must have been fixed in their concave sections. However, their function is unknown. The upper parts of the western, northern and eastern walls were deeply engraved with ledges where the seated statues should be situated. At the centre of the ledge on the northern side is a hole that leads into Cave A Lower (a); this hole could have been used for lighting or ventilation when the cave was used as a residence.

It is intriguing to investigate the layout of the top of the western side wall in the forecourt. While the bedrock above the forecourt is a sheer cliff, the top of the western wall rises and protrudes from the vertical cliff (Fig. 237). What does this mean? The finishing chisel work on the upper part of the western wall stops at a point level with the bottom of the ledge on the northern wall, which suggests that only the chiselled area used to be covered by the ceiling.

Present condition: In the centre of the western wall is the entrance to the corridor to Cave A Lower (b), which is this cave's western neighbour. This corridor was a later addition to the cave. The current mud brick wall in this space was built up in 2003 in order to protect the cave along with the netted door at the southern entrance. The walls indicate that the cave benefited from later efforts by the Archaeological Survey of India (ASI) to provide treatments to prevent the wall clay from falling. The side walls and the tambour, however, were damaged by natural erosion and human destruction. In particular, the devastation of the mural paintings on the tambour seems fresh, suggesting that this destruction was recent. While a crack runs above the entrance, there are no distinct cracks inside the cave.

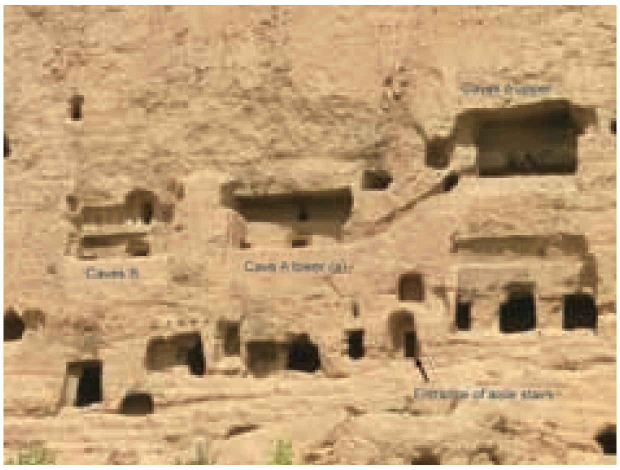


Figure 228 Caves A Lower: façade.

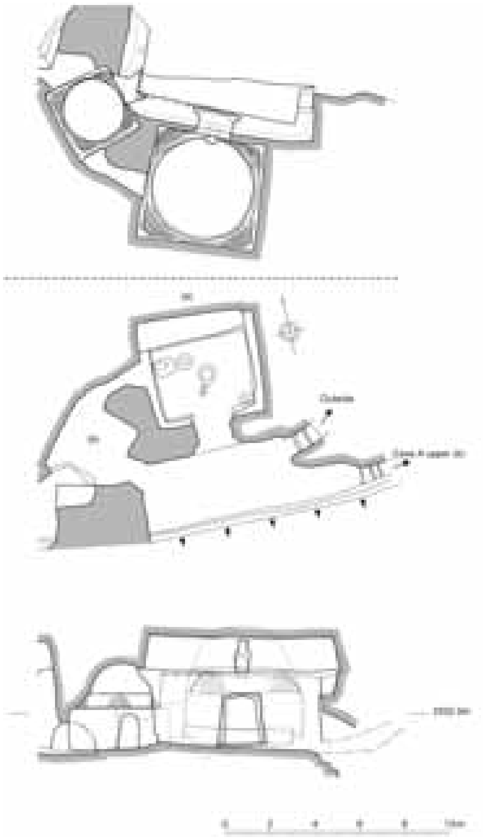


Figure 229 Cave A Lower (a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

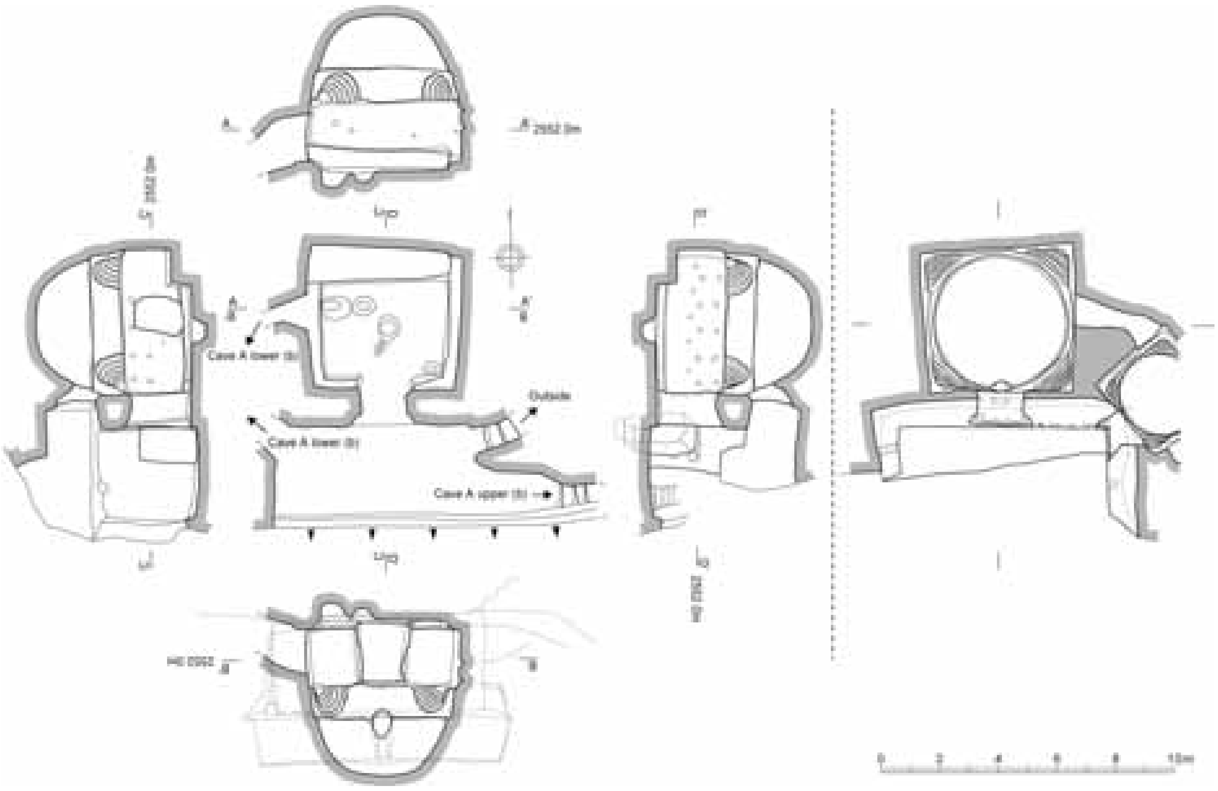


Figure 230 Cave A Lower (a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

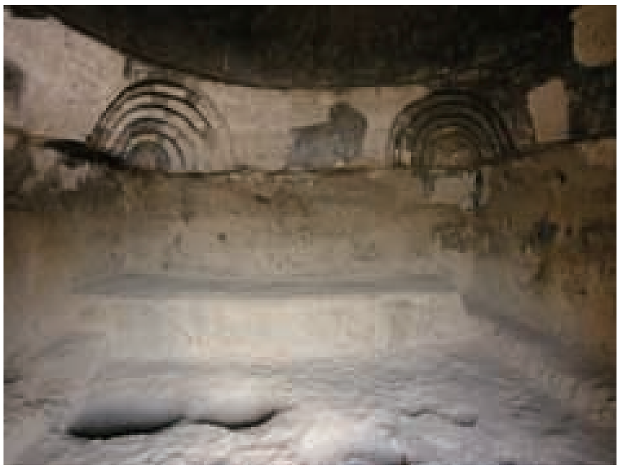


Figure 231 Cave A Lower (a): northern side.

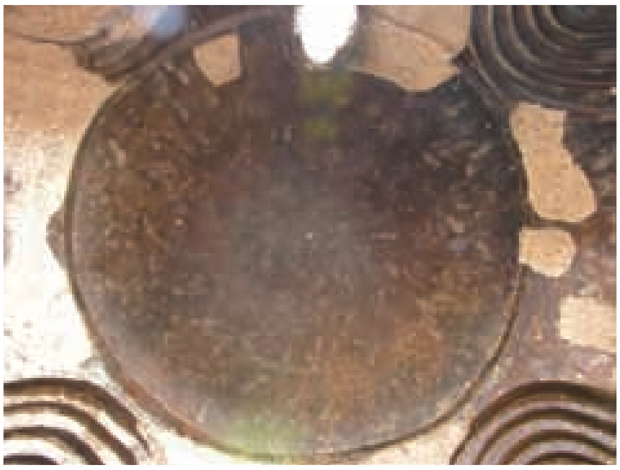


Figure 234 Cave A Lower (a): ceiling.

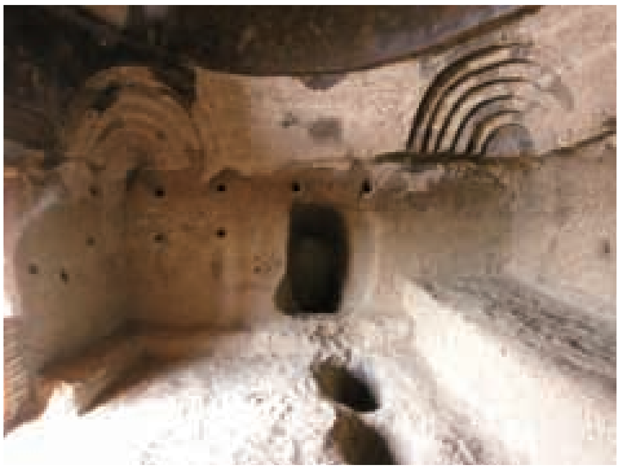


Figure 232 Cave A Lower (a): western side.

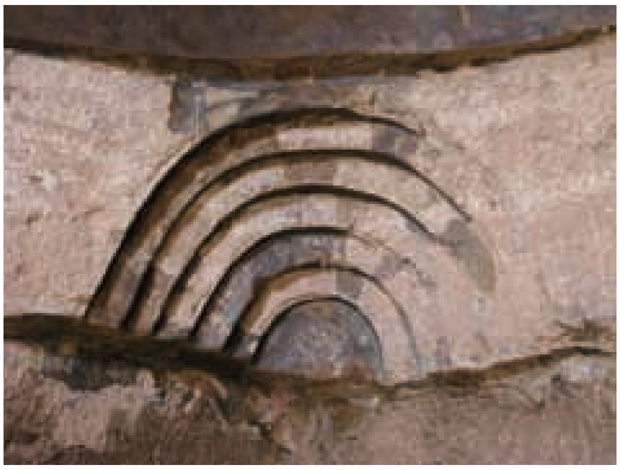


Figure 235 Cave A Lower (a): squinch.

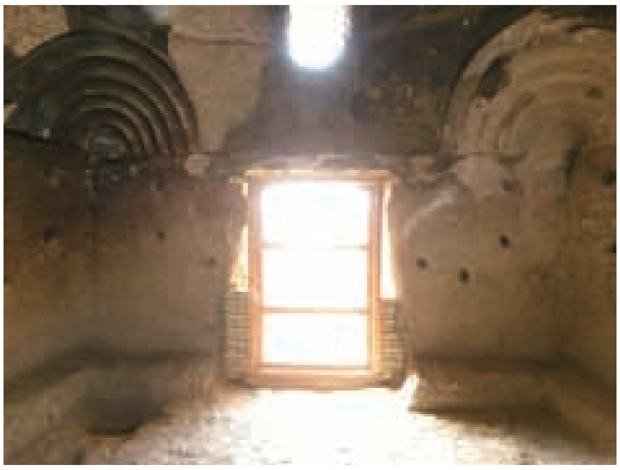


Figure 233 Cave A Lower (a): southern side.

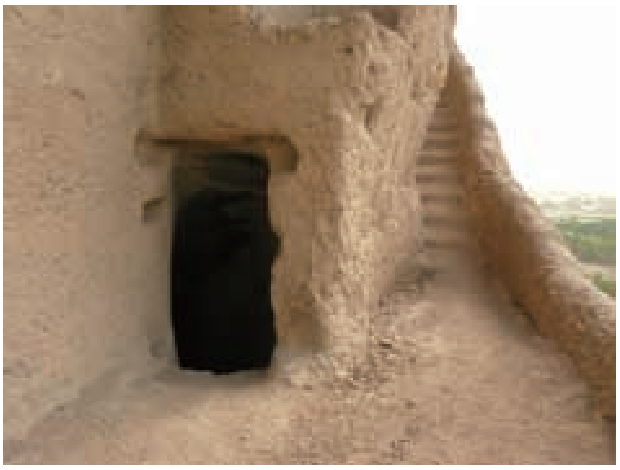


Figure 236 Cave A Lower (a): eastern side of forecourt.

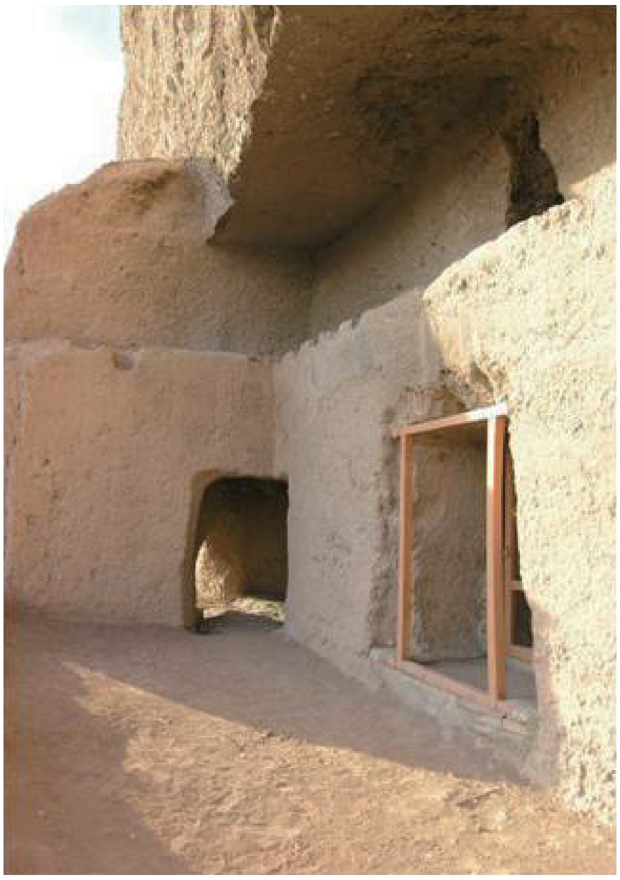


Figure 237 Cave A Lower (a): western side of forecourt.

Cave A Lower (b)

Location: Cave A Lower (b) is just west of Cave A Lower (a). The axis of Cave A Lower (b) is out of alignment by 50 degrees, in a counter-clockwise direction, compared to the axis of Cave A Lower (a).

Form: Square plan; domed ceiling; squinch. The tambour is directly connected with the domed ceiling, without a cornice on top of the side walls. It can be said that the form of Cave A Lower (b) is a miniature version of Cave A Lower (a). At the four corners of the tambour, there are quadruplicate squinches.

Technique and design: It is clear that the inside of the cave was entirely coloured based on the remaining coloured layers on the side walls, tambour and domed ceiling. The squinches and domed ceiling form precise semicircular shapes, indicating that this cave was created skilfully, even though it is small in size. This is not the case with Cave A Lower (a).

Present condition: The southwest side wall is partially collapsed so that it is possible to go from Cave A Lower (a) through to Cave B(b), which is a more recent development (Fig. 234). Some remnants of wall clay are found in a patchy fashion around the interior of the cave.

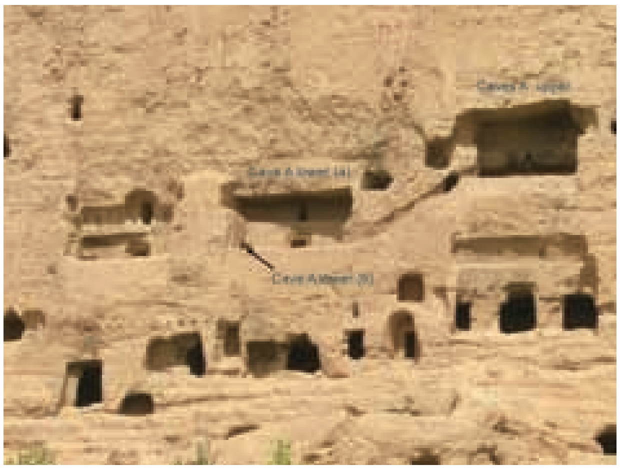


Figure 238 Cave A Lower (b): façade.

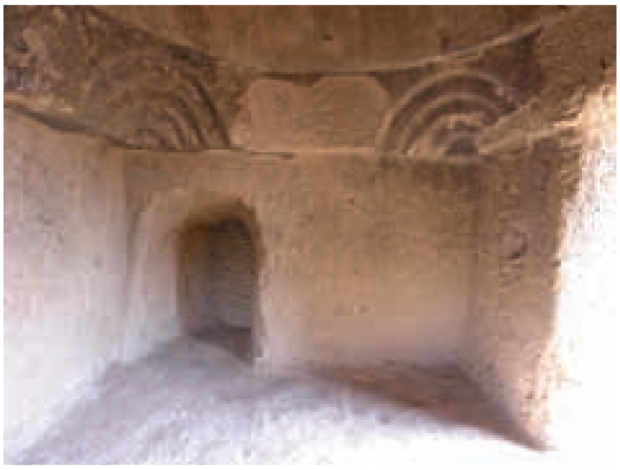


Figure 239 Cave A Lower (b): northern side.

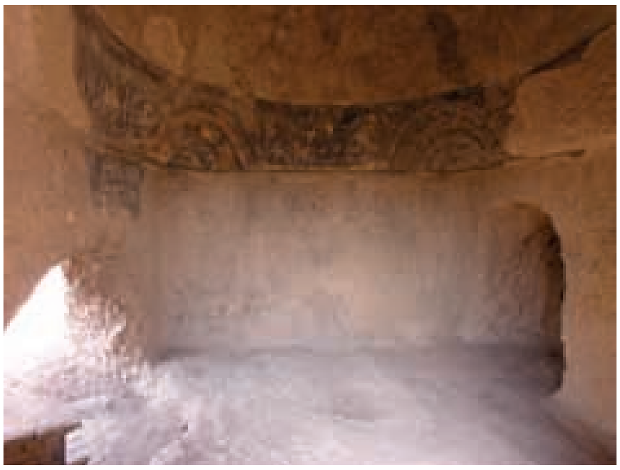


Figure 240 Cave A Lower (b): northwest side.

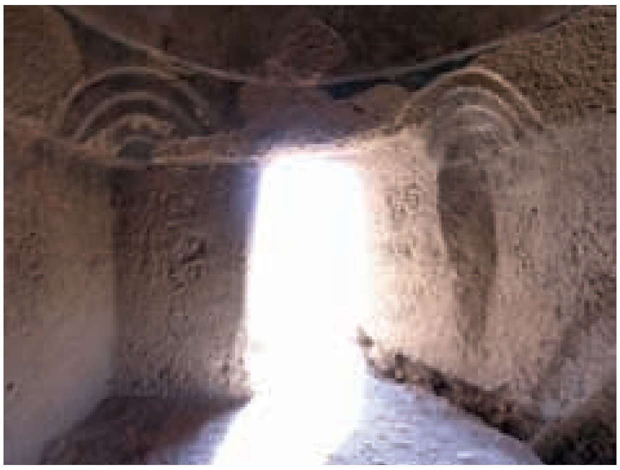


Figure 241 Cave A Lower (b): southeast side.

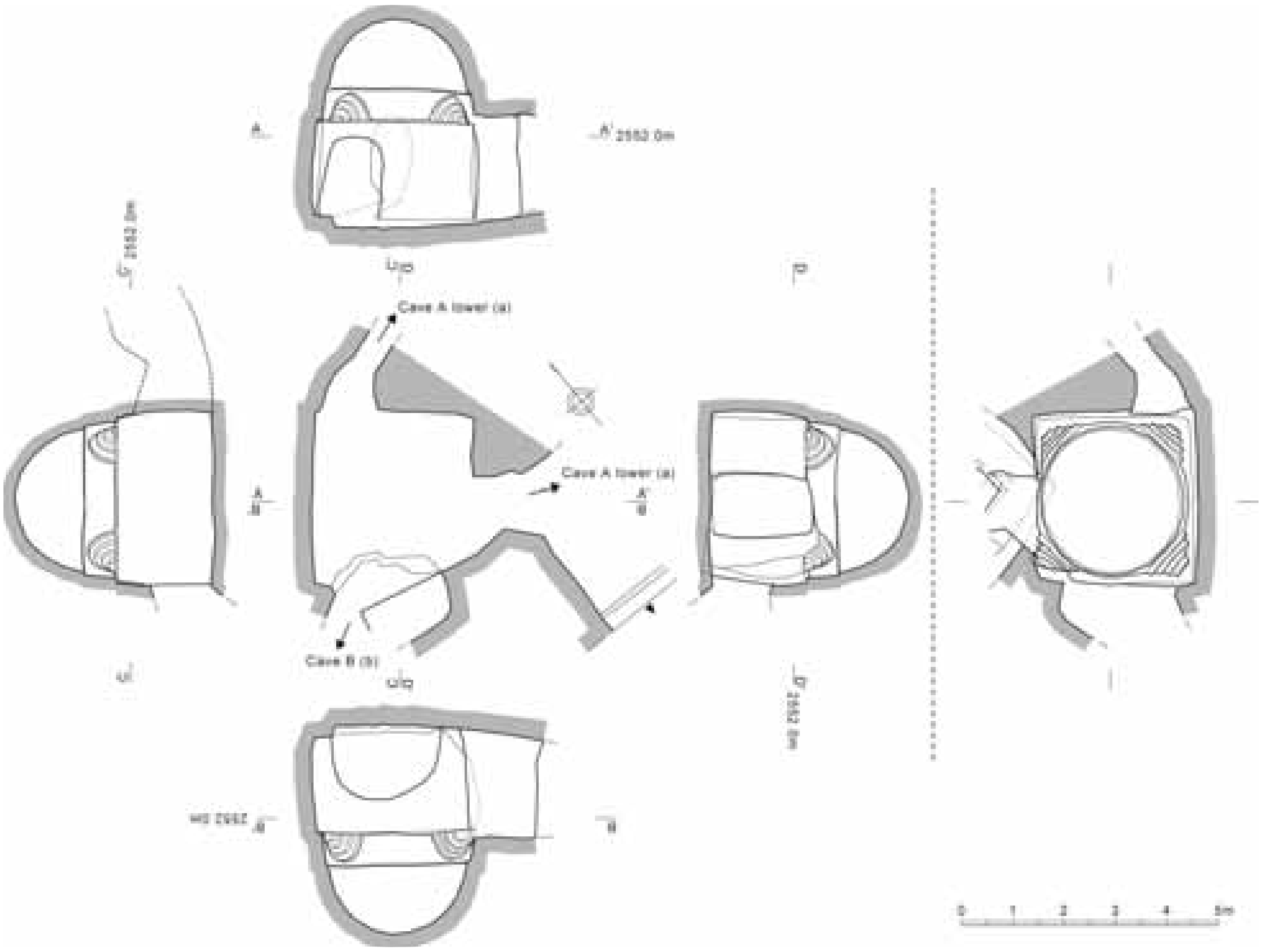


Figure 242 Cave A Lower (b): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

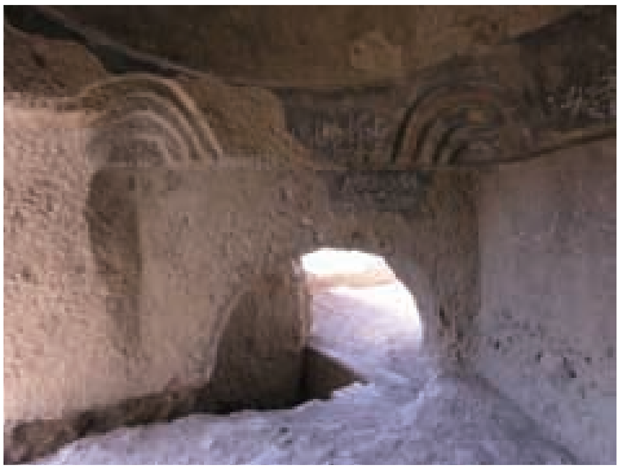


Figure 243 Cave A Lower (b): southwest side.

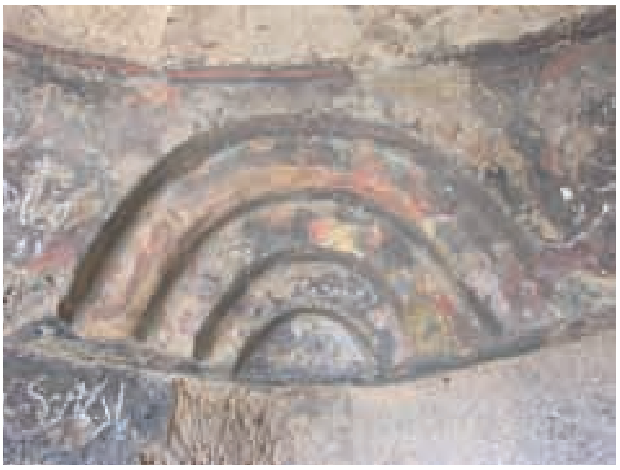


Figure 244 Cave A Lower (b): squinch.

Cave 134

Location: Cave 134 is situated below Caves B and Caves A Lower, and to the east of the East Giant Buddha. The stairway leads up from the opening section to the east of Cave 134 and towards the forecourt of Caves B.
Form: Cave 134 has a rectangular plan and a vaulted ceiling. The central part of the northern side is raised, in the shape of a prismatic column, by small niche-like spaces in the northeast and northwest corners. This is unique in Bamiyan. On the ceiling of the small space at the northeast corner is a hole that leads up to the stairway that connects the eastern side of this cave to the upstairs area (Fig. 249).

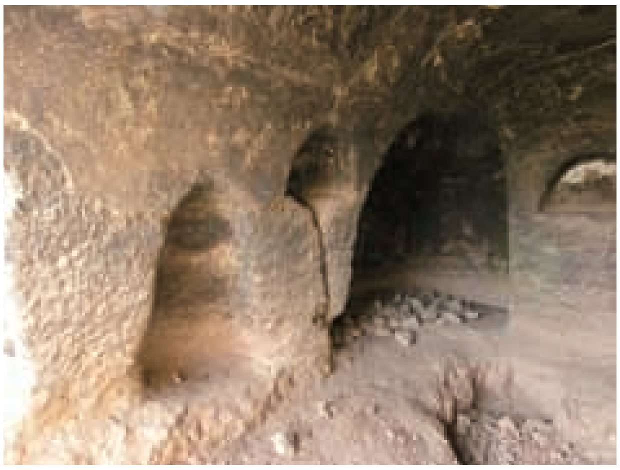


Figure 247 Cave 134: western side.

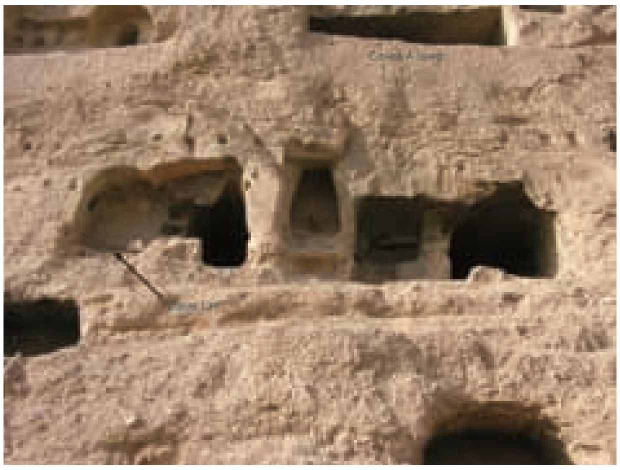


Figure 245 Cave 134: façade.

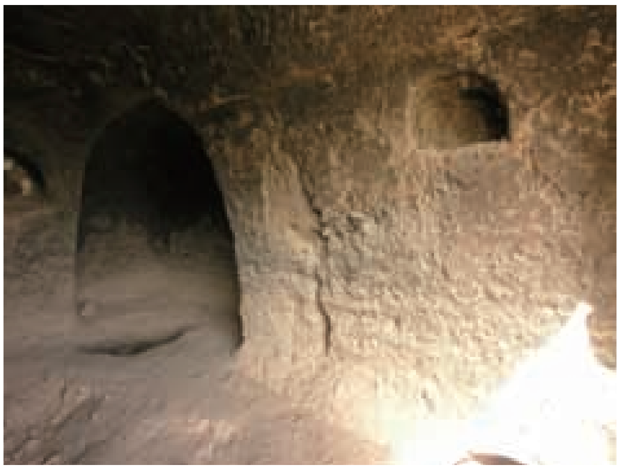


Figure 248 Cave 134: eastern side.

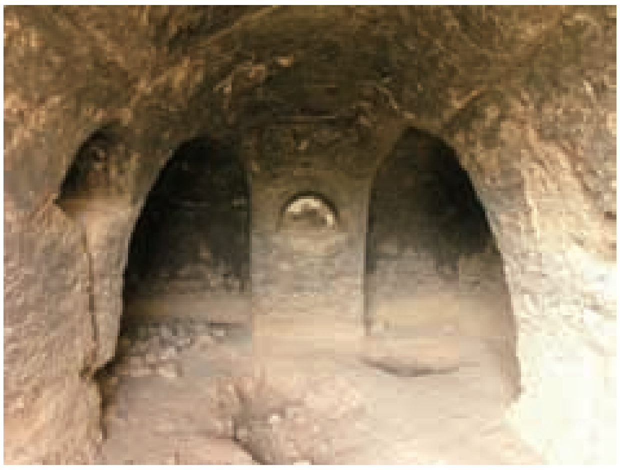


Figure 246 Cave 134: northern side.

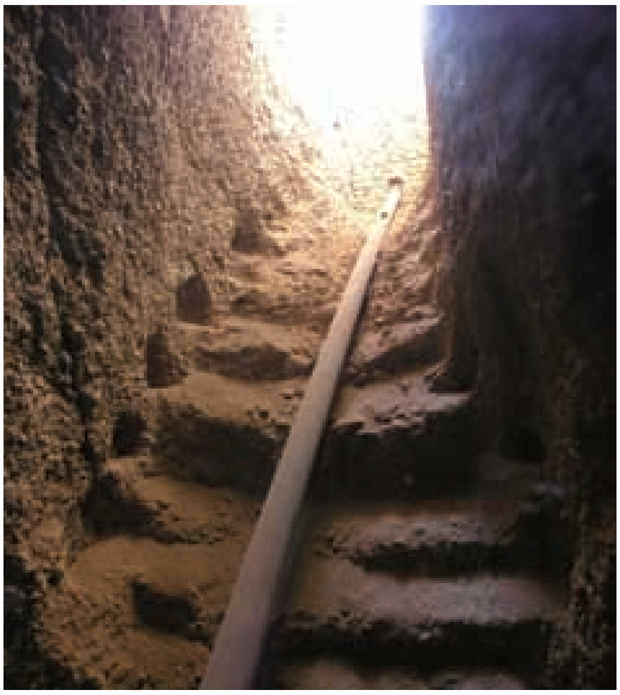


Figure 249 Cave 134: step corridor to the upstairs of Cave 134.

Cave 136

Location: Cave 136 is located below Caves B on the eastern side of the East Giant Buddha. This cave is slightly below and to the west of Cave 134.

Form: Cave 136 has a square plan and a *laternen-decke* with two staves, at the centre of which a small dome is engraved.

Present condition: The southern side has collapsed. Also, the western side of the cave and the southern part of the ceiling are severely damaged. A crack runs vertically down the northern side. The condition of the cave is extremely poor.

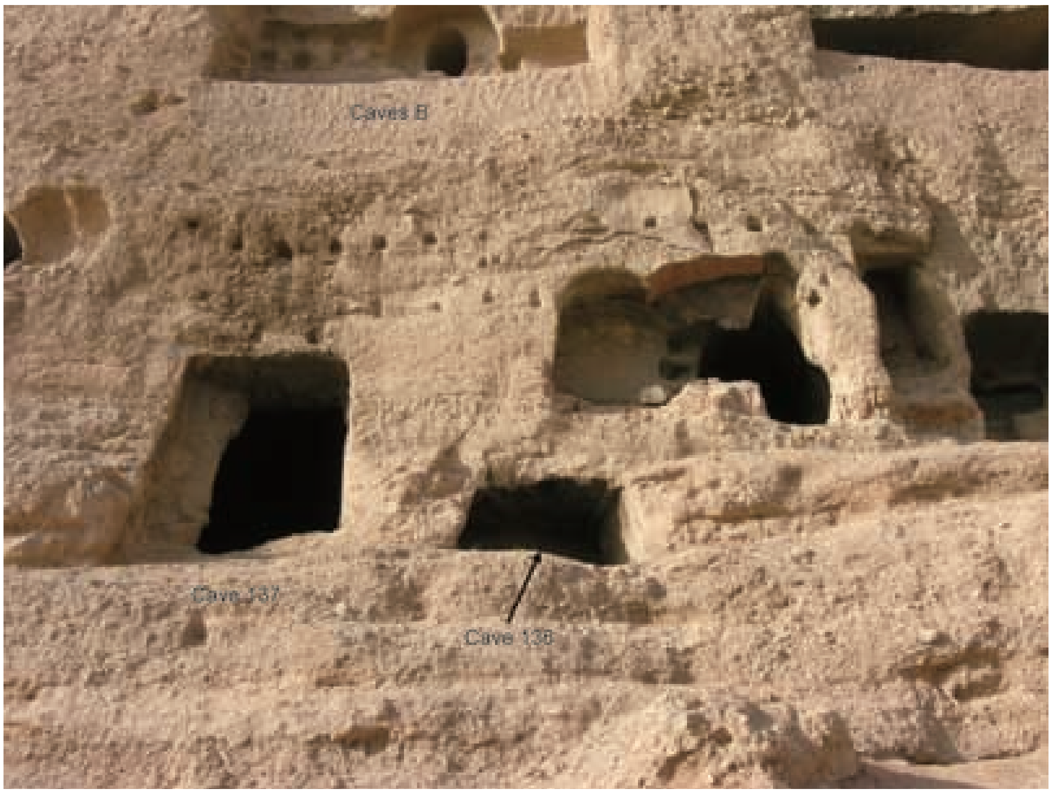


Figure 250 Cave 136: façade.

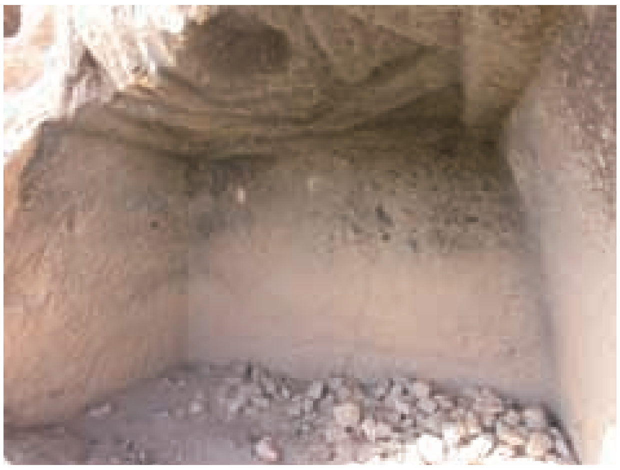


Figure 251 Cave 136: northern side.

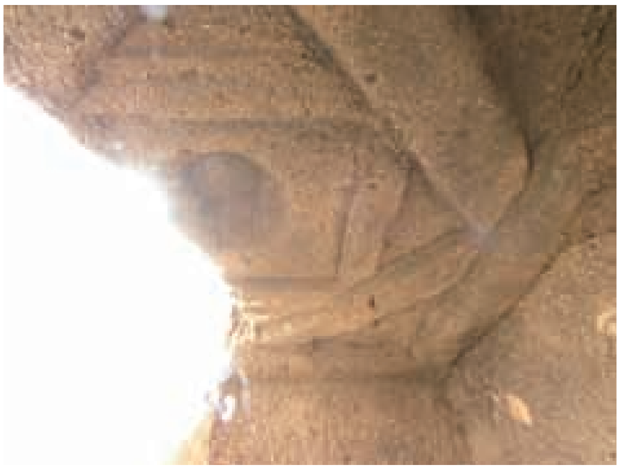


Figure 252 Cave 136: ceiling.

Cave 137

Location: Cave 137 is situated at the centre of the eastern side of the East Giant Buddha. It is below Caves B and to the west of Cave 136.

Form: Cave 137 has a square plan with a domed ceiling. There is no squinch but instead a ladder-shaped decoration is engraved on the transitional section between the wall and the dome. Niches were created in the northern, eastern and western sides.

Present condition: A furnace, covered in black soot, on the floor must have been used when this cave functioned as a residence. It is not clear if this cave had a forecourt because the southern side, including the entrance, has collapsed. The entrance retains two horizontal lines of holes evenly aligned on its upper portion, which continue to the entrance of Cave 134 (Fig. 253).

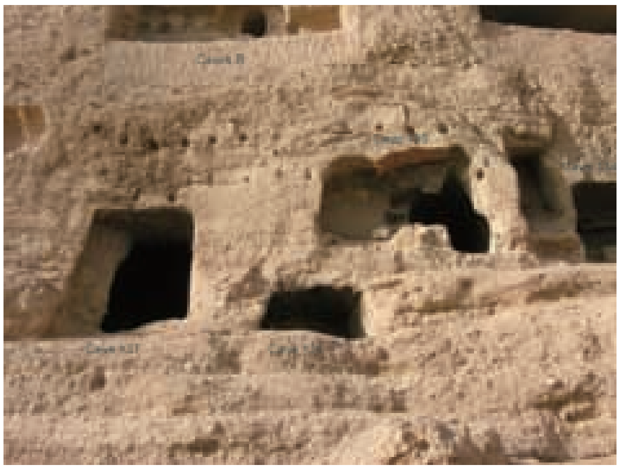


Figure 253 Cave 137: façade.

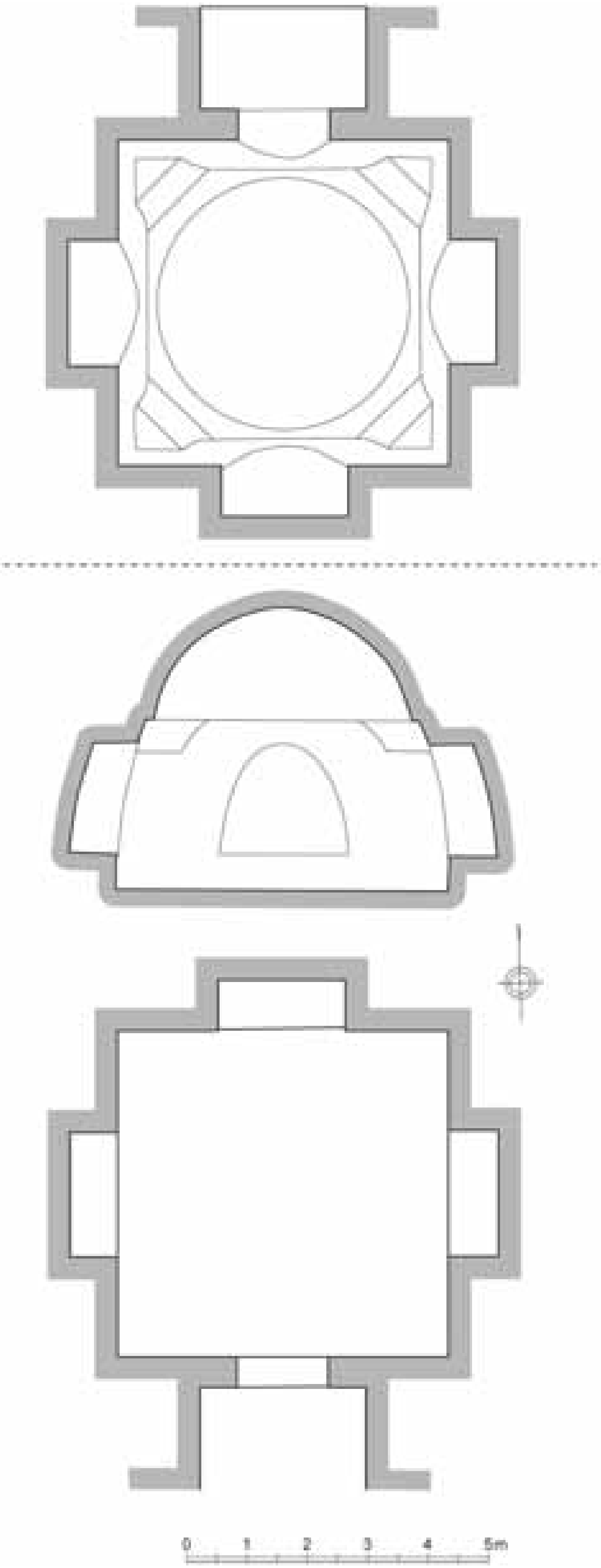


Figure 254 Cave 137: plan; section; ceiling (after Kodera *et al.* 1971).

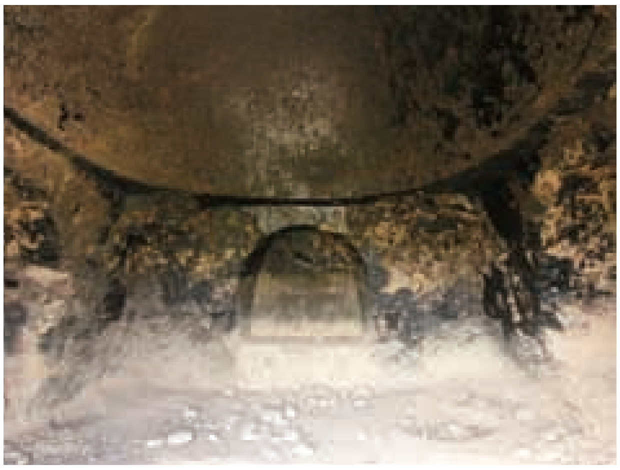


Figure 255 Cave 137: northern side.

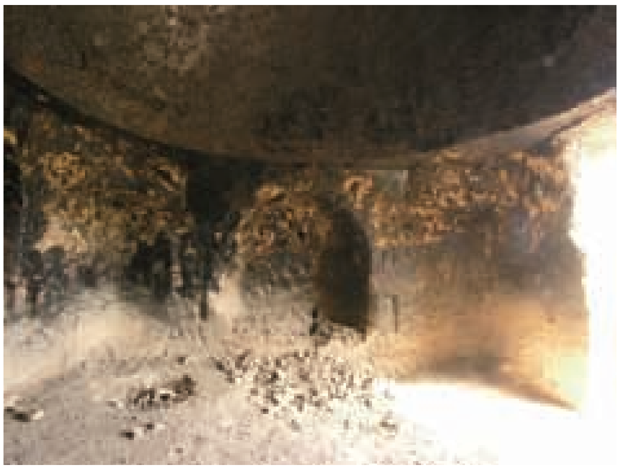


Figure 257 Cave 137: eastern side.

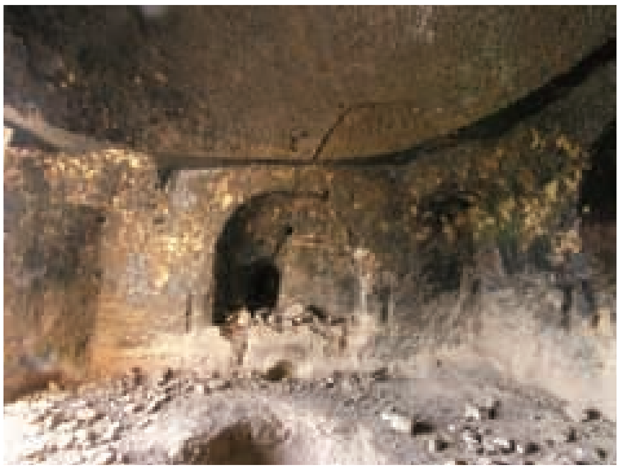


Figure 256 Cave 137: western side.

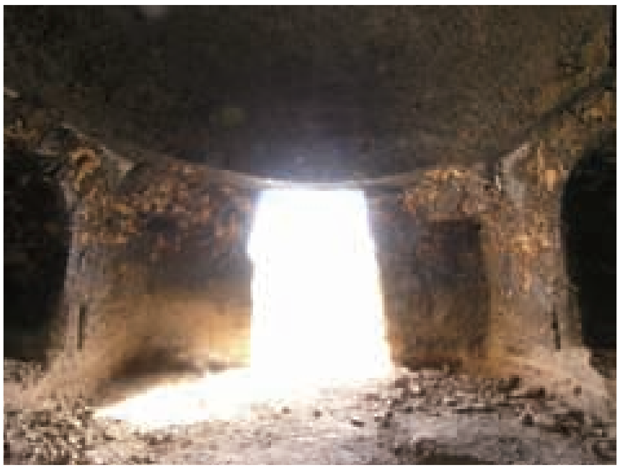


Figure 258 Cave 137: southern side.

Cave B(a)

Location: Caves B are located between the East Giant Buddha and Caves A Lower. Caves B consist of six caves, namely Cave B(a) and Cave B(c)–Cave B(g), and Cave B(b) as a forecourt. Cave B(a) and Cave B(c)–Cave B (g) have square and rectangular plans, respectively.

Form: Square plan; domed ceiling; squinch. With regard to size and configuration, Cave B(a) is similar to Cave A Lower (a) in that both caves have square plans and their flat domed ceilings are engraved on the tambour without cornices on the tops of the side walls. Cave B(a) is equipped with a bench-style pedestal running along the side walls, as is Cave A Lower (a). On the other hand, the pedestal along the northern side extends to both the eastern and western walls of Cave B(a), which it does not do in Cave A Lower (a). At the four corners of the tambour corbelled on top of the walls there are quintuple squinches, which are flat with a wide hem. The domed ceiling is raised above the corbelled point of the tambour.

Technique and design: On the eastern and western walls are four horizontally aligned mortises corresponding to the bench-style pedestals, probably intended originally to hold the statues. As for the southern side, one mortise is to the west of the entrance and four are to the east of the entrance. Judging from the size of the pedestal, it is unlikely that four statues were set up on that spot. It is therefore natural to assume that some of these mortises were created in a later period. These mortises are fixed at a height of 1.5 m from the upper edge of the pedestal. Their diameter is approximately 12–15 cm and the depth is roughly 25–40 cm.

The pedestal in the front (the northern side) is larger than those on the eastern and western sides. No mortises above the pedestal on the northern side have been confirmed during this investigation. As with Cave A Lower (a), it is likely that some seated statues would have been fixed in the front (north) of the cave, and that standing statues were located in front of the other three side walls (east, west and south). Wall clay layers on the walls show that the walls must have been recoated in different periods. The surface of the squinch, contrasting with that of the domed ceiling, is smoothly finished, which suggests that it was repaired during the restoration projects.

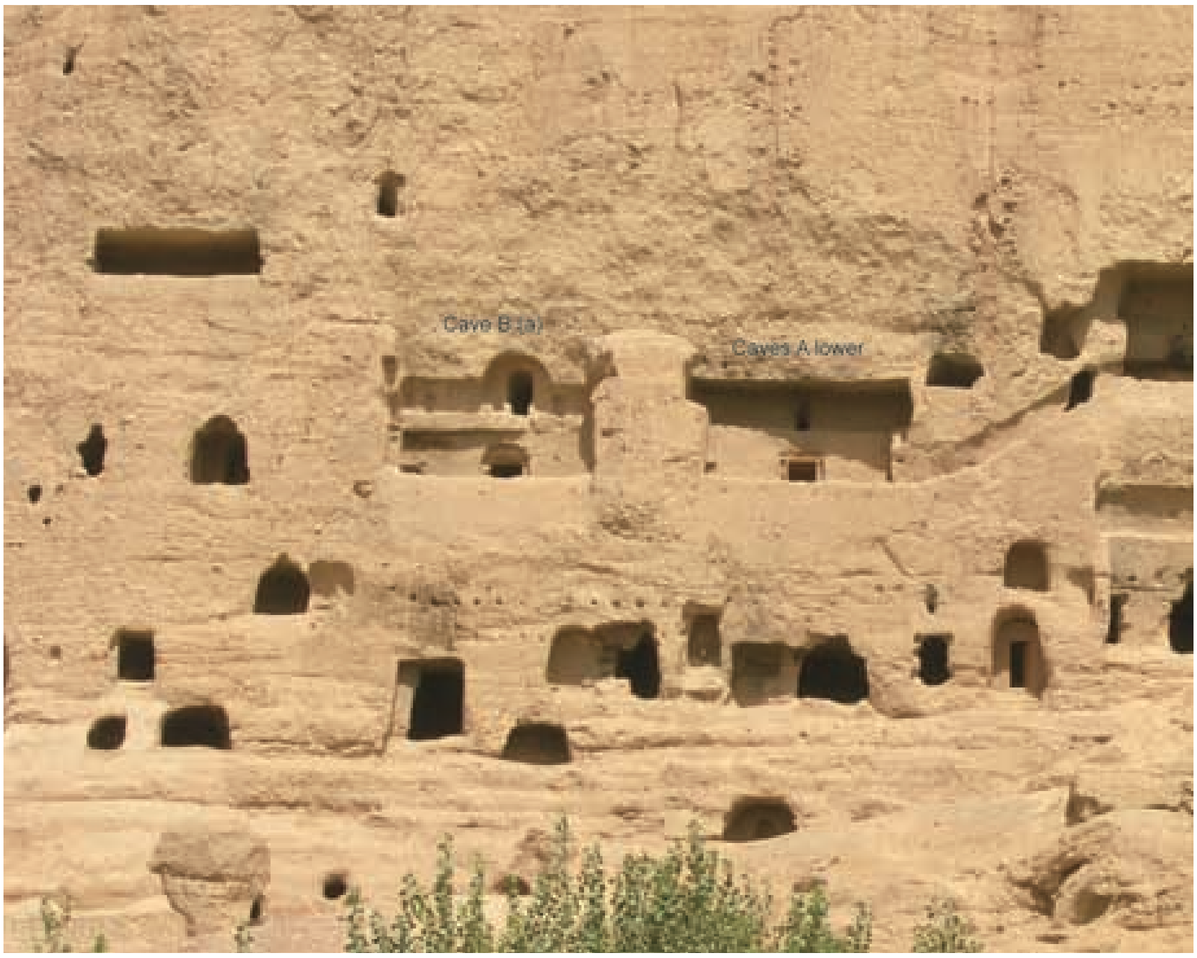


Figure 259 Cave B(a): façade.

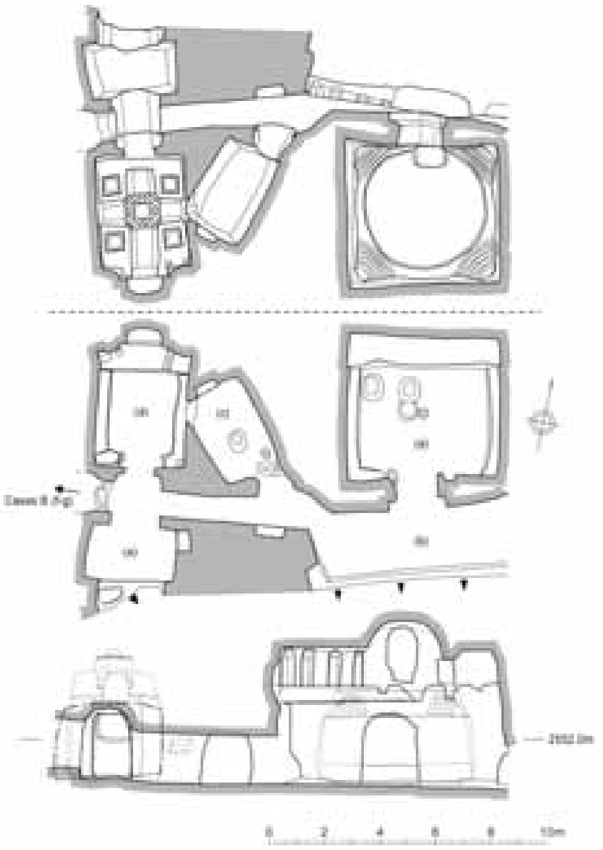


Figure 260 Caves B: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

No mural paintings have been confirmed. The domed ceiling retains the top layer, which shows that the layers of wall clay are from at least two distinct periods. Mural paintings have not been observed yet due to defacement and change of colour. Thus it appears that this cave had a number of seated statues on the northern pedestal, at least four standing statues on the eastern and western pedestals, some standing statues on the southern pedestal, and several mural paintings.

There is evidence to suggest that the forecourt of this cave was originally richly decorated (Fig. 267). Some arched engravings remain around the entrance. At the foot of the arches are holes measuring 30 cm high on both the left and right sides of the entrance – probably mortises designed to fit the lintel. A large ledge is engraved on the upper northern wall of the forecourt. Its corbel becomes smaller as it runs from the west end to the east, and is finally flattened at the east end and level with the wall itself. This is due to the fact that the bedrock has collapsed on the eastern side, demolishing the original structure. In addition, the eastern part of the northern wall inclines while the western part stands vertically (Figs 268, 269).

A large niche is situated slightly east of the centre position on this northern ledge. The niche is a double structure. The smaller niche at the back is connected to the inside of Cave B(a) (Fig. 264). This niche could be

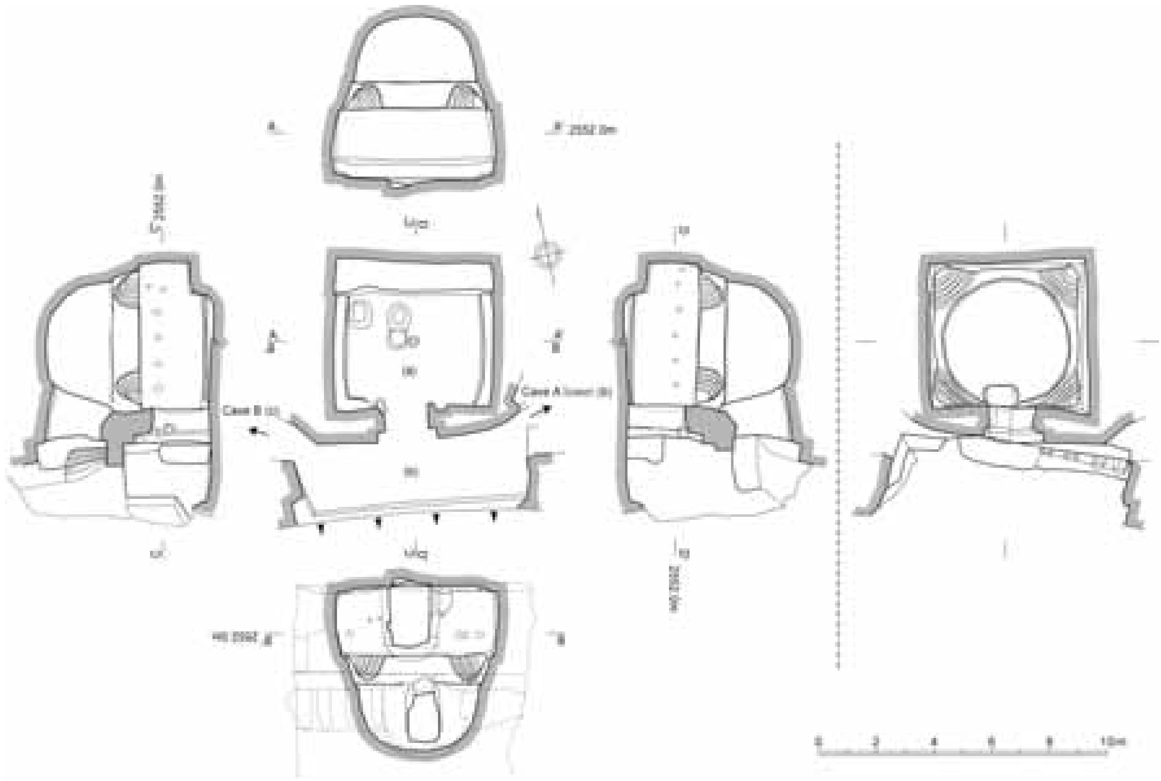


Figure 261 Cave B(a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

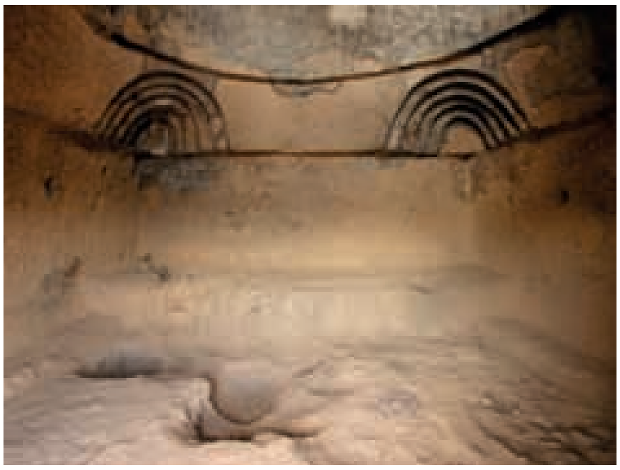


Figure 262 Cave B(a): northern side.

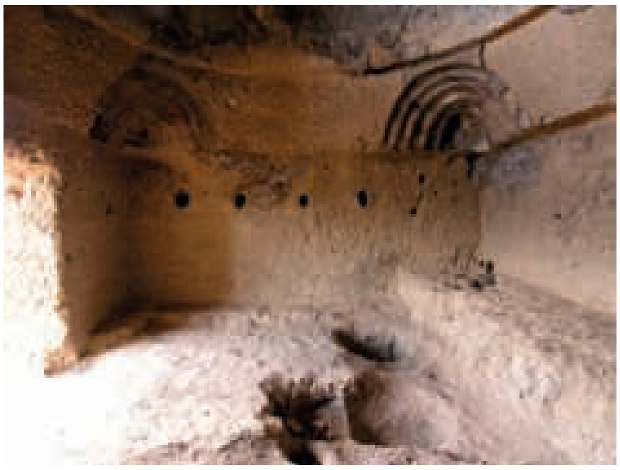


Figure 263 Cave B(a): western side.

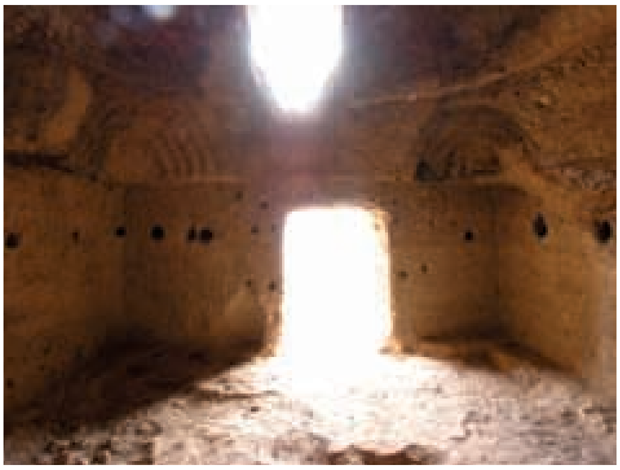


Figure 264 Cave B(a): southern side.

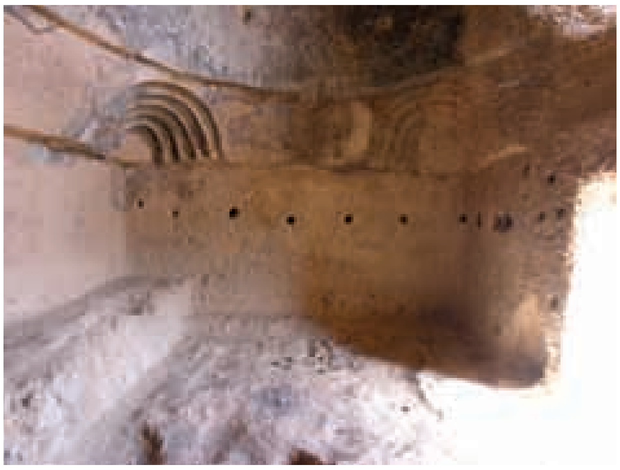


Figure 265 Cave B(a): eastern side.

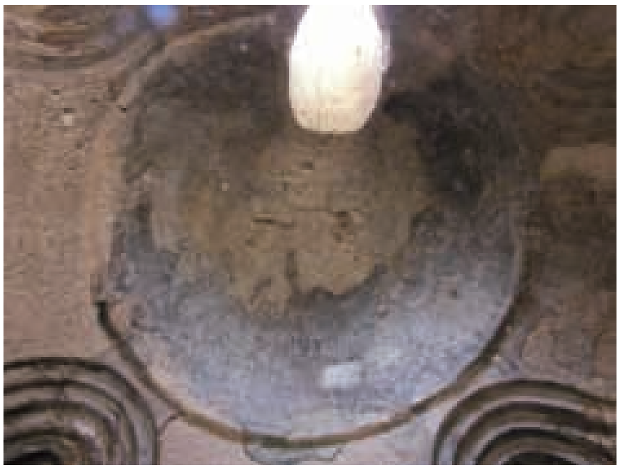


Figure 266 Cave B(a): ceiling.

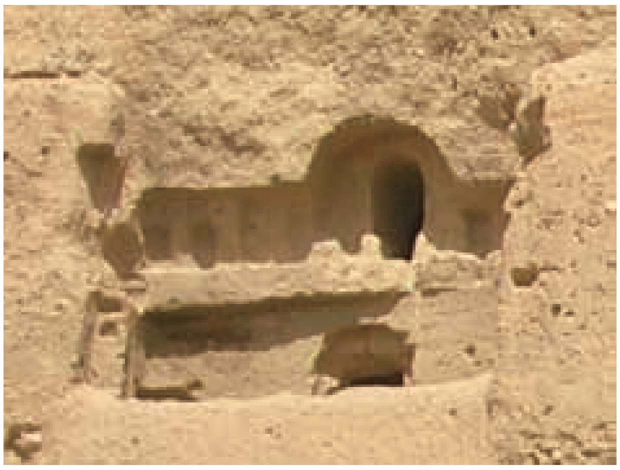


Figure 267 Cave B(b) as a forecourt: façade.

used for lighting in future restoration projects. To the west of this niche there are possibly four more niches that have been damaged by weathering and the collapse of the bedrock. The western side of the niche was definitely coated with wall clay, even though it might not have been the top layer. The other face, the eastern side of the niche, also shows some traces of other niches. The shapes on the eastern and western walls are not symmetrical. Both walls have shallow hollows above the level of the ledge on the northern wall, but the heights of each are different.

While the eastern hollow is above the top level of the ledge, the western hollow is below the bottom level of the ledge. Both hollows have large rectangular mortises close to the cliff, the heights of which are also different from each other. Some traces of the old clay wall remain above the entrance and at the bottom of the ledge.

Present condition: Several cracks are confirmed inside the cave. The crack running radially from the centre of the ceiling to the east, west and south was presumably the result of a change in stress caused by construction of the domed ceiling. The crack running vertically to the cliff above the entrance is highly visible.

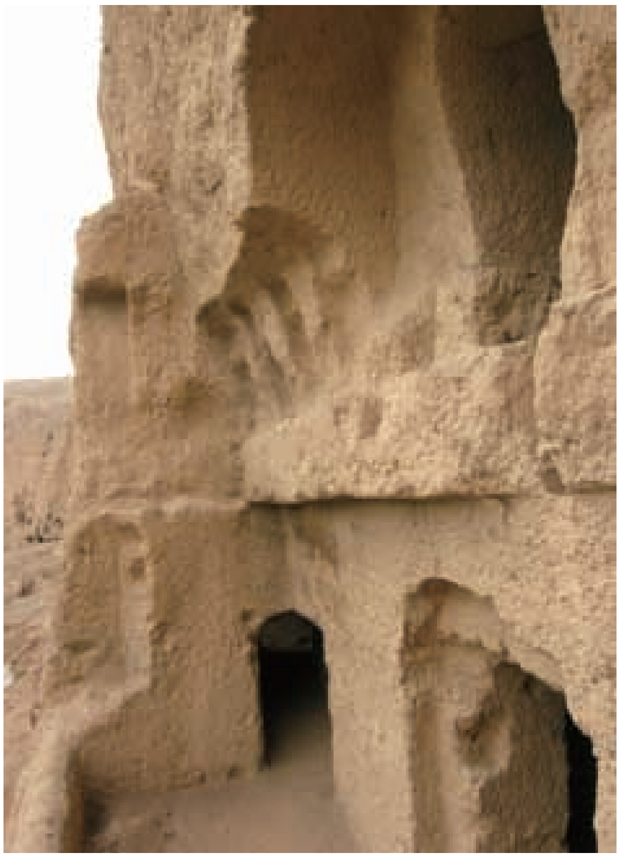


Figure 268 Cave B(b) as a forecourt: western side.

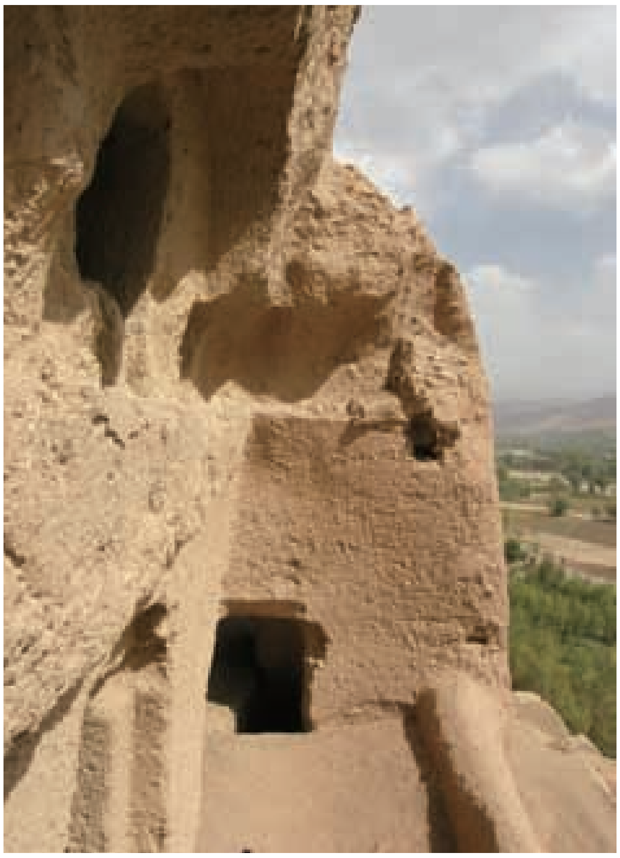


Figure 269 Cave B(b) as a forecourt: eastern side.

Cave B(d)

Location: Cave B(d) is situated between the East Giant Buddha and Caves B.

Form: Rectangular plan; cross-vaulted ceiling. Cave B(d) has a rectangular plan and rising side walls. The ceiling is engraved with the cross-vaulted motif with a quarter line section. Each side wall inclines and rises to the ceiling with a moderate curve. Low bench-style pedestals are fitted around the side walls. Their surfaces are badly weathered and damaged, making it difficult to discern the original plan. Nevertheless, it is clear that the pedestal on the northern side is slightly higher than those of the other sides.

Technique and design: The curved cross on the ceiling divides the rest of the area into four rectangular spaces with a square and a dome engraved at the centre of each (Fig. 271). The cross inclines and the centre of the intersection is engraved much deeper than the surrounding area. It is decorated with a *laternen-decke* with two ceiling joists in which the dome is constructed. Thus Cave B(d) is unique among the caves in Bamiyan because it has a square and a dome engraved at the four corners of the bottom of the ceiling, and also a cross-vaulted ceiling consisting of the *laternen-decke* with a dome at the top of the ceiling's centre.

The domed ceiling surface, northern side wall and coloured layer at the rim of the ceiling all indicate that the cave's interior used to be covered with mural paintings. It seems that the colouring was executed in the early stages of decoration. It is difficult to determine if the current ceiling shows the original plan. The most preserved coloured layer on the top of the side wall, to the left of the northern side, is surrounded by walls with severely faded layers of colour. This indicates that these walls were finished with polished plaster and are therefore different from those in other caves.

There was certainly something fixed in two places just below the ceiling on both sides of the northern wall, and there is a mortise at the bottom of the ceiling on the right side. Under the circumstances, it is reasonable to consider that something was fitted on both sides of the northern wall, although there is no definitive proof. The bench-style pedestal engraved higher than the others along the northern side wall (Fig. 273) may well indicate the importance of this point.

The front room, Cave B(e), is south of Cave B(d). The layout of the caves around these two caves is extremely complicated. Just to the west of the space between Cave B(d) and Cave B(e) is Cave B(g), which features a small square plan and the shadow of a domed ceiling. The corridor constructed in a later period in front of Cave B(d) also penetrates Cave B(g) (Fig. 277). Under the corridor is a stairway, not currently in use, that runs down eastwards from the west side of Cave B(g) (Fig. 279). There are two small chambers in the upper part of the eastern wall between Cave B(e) and Cave B(d), which were presumably fitted in a later period. As mentioned above, the layout around Cave B(d) is highly complex. It will be necessary for future studies to investigate the original plan and the history of changes.

Present condition: Clay walls partially remain in this cave. There are some indications of a more recent conservation project performed on these clay walls. It seems that the current top layer of the ceiling may well have had some conservation work done at the same time.

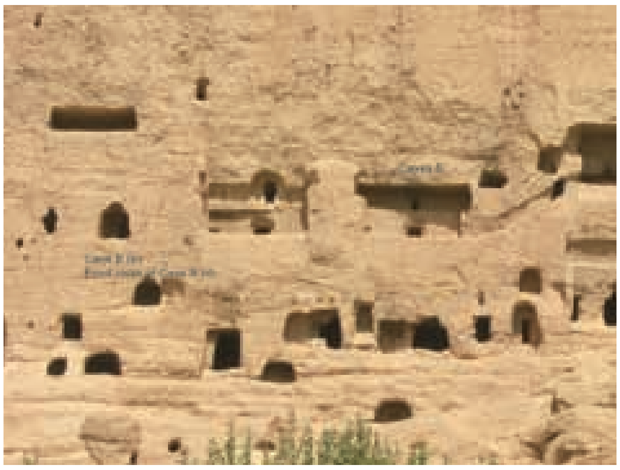


Figure 270 Cave B(e): façade of the front room of Cave B(d).

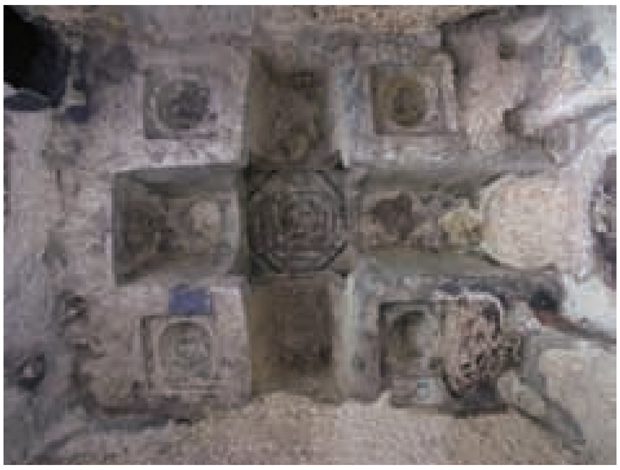


Figure 271 Cave B(d): ceiling.

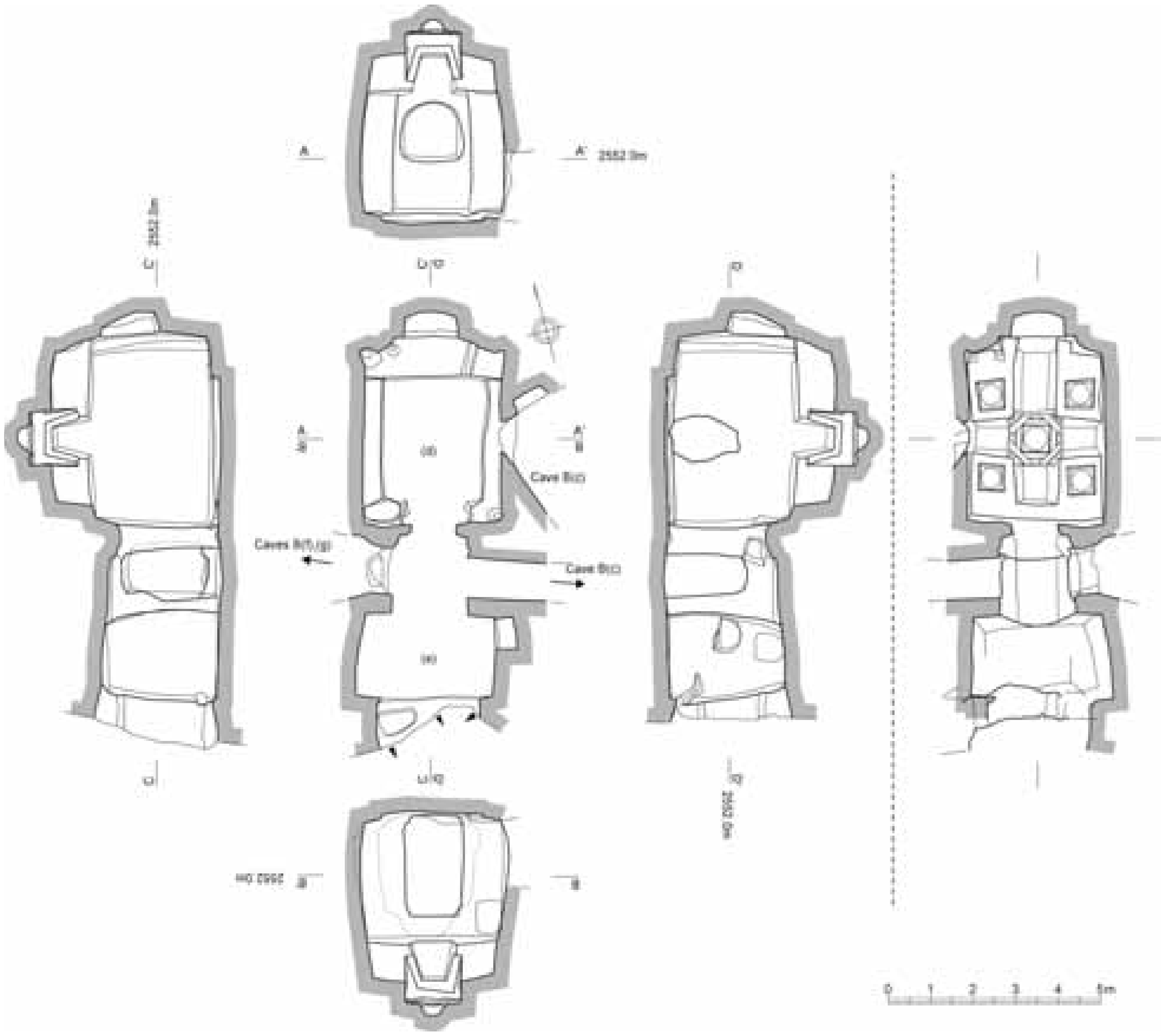


Figure 272 Cave B(d): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

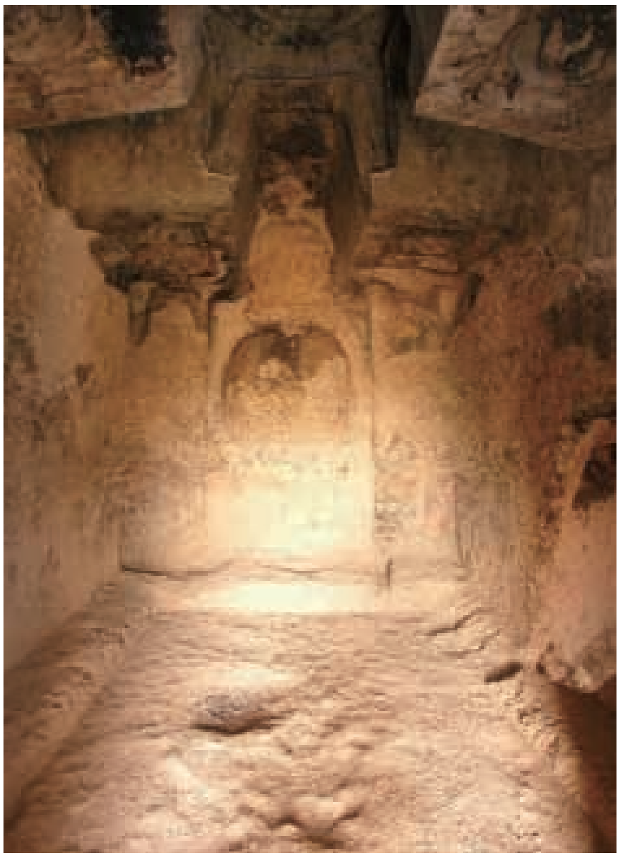


Figure 273 Cave B(d): northern side.

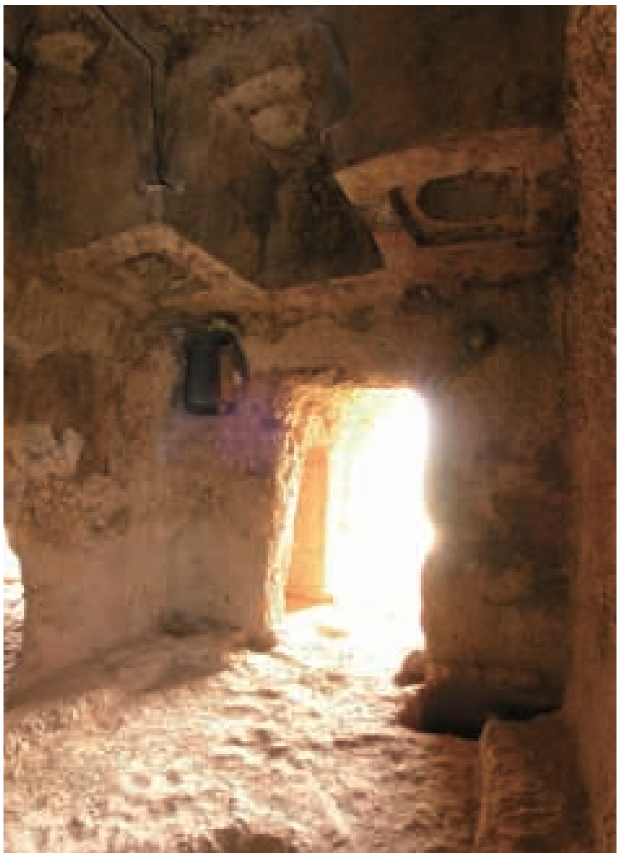


Figure 275 Cave B(d): southern side.

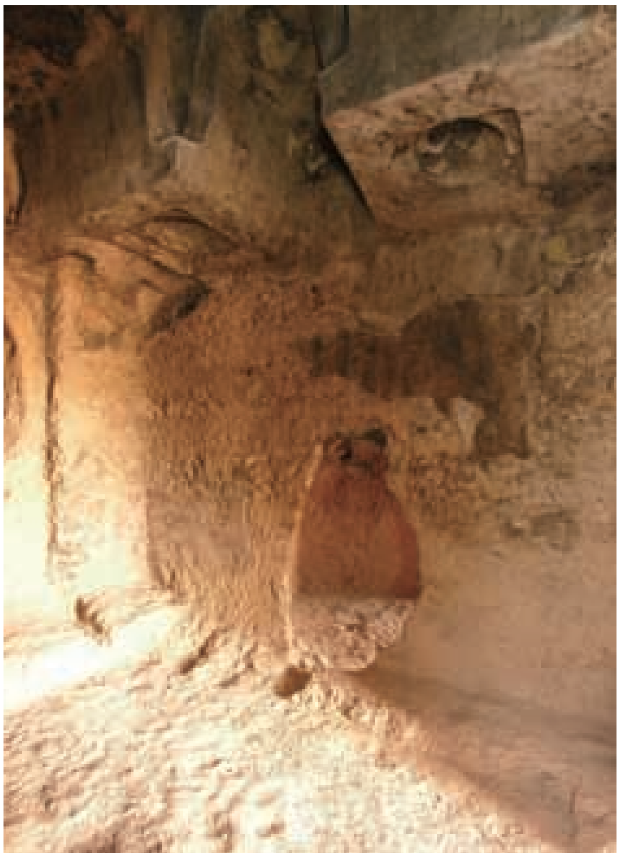


Figure 274 Cave B(d): eastern side.

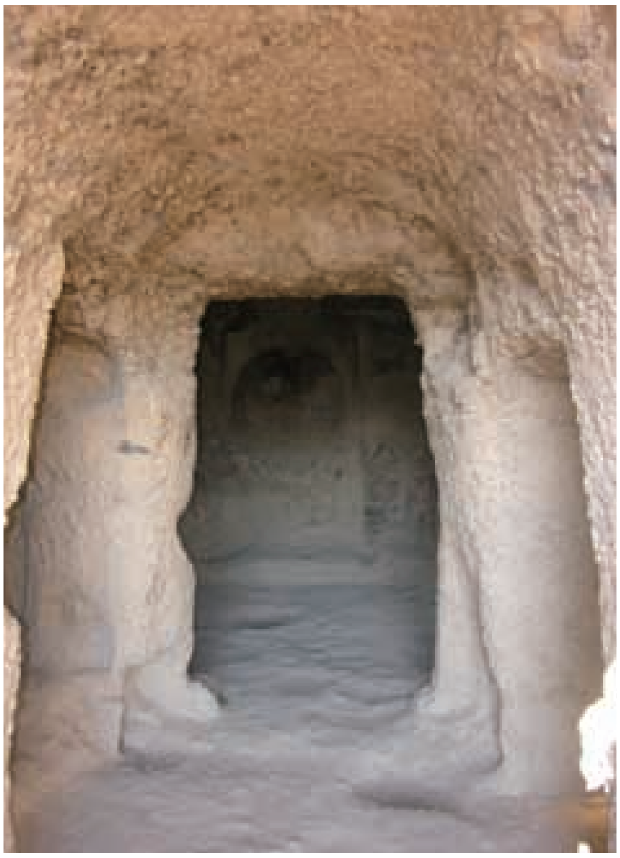


Figure 276 Cave B(d): entrance.

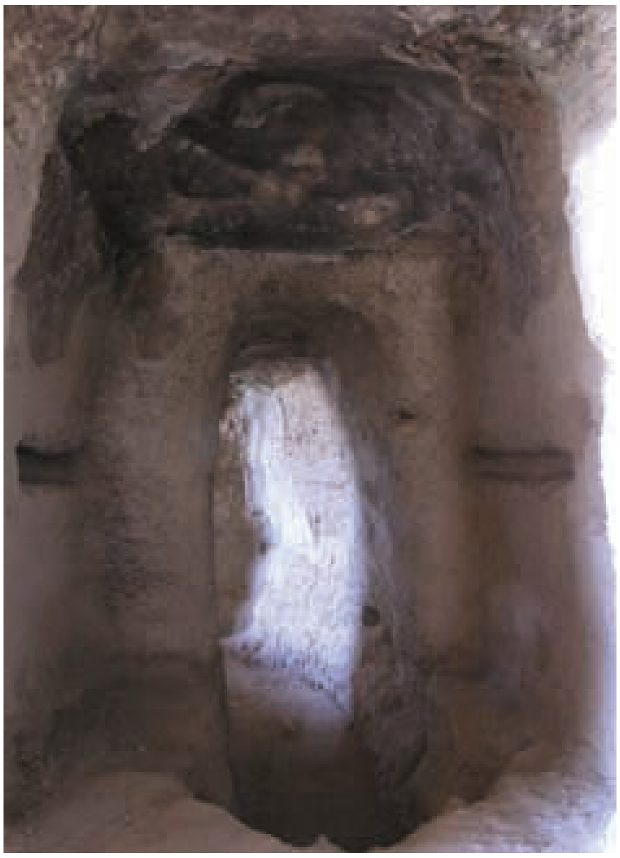


Figure 277 Cave B(g): western side.

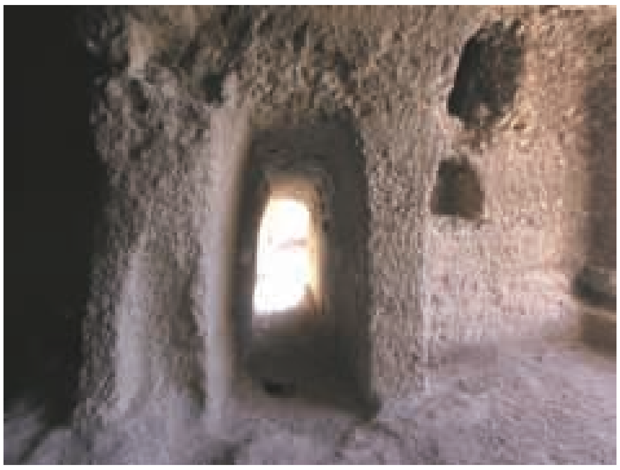


Figure 278 Corridor from Cave B(d) to Cave B(c) (looking eastwards).

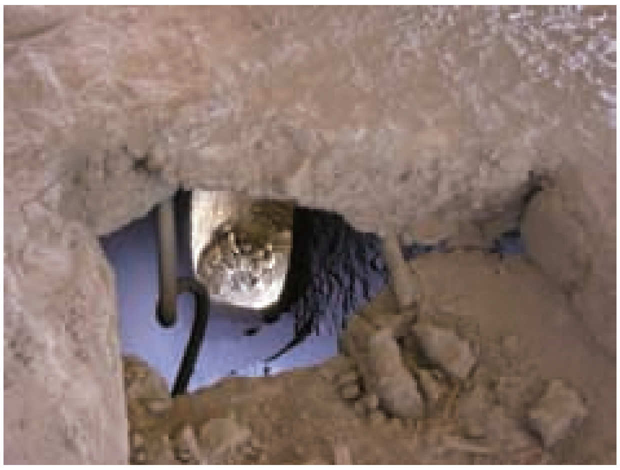


Figure 279 Stairway under the corridor in front of Cave B(d).

Cave B1(c)

Location: Caves B1 are located to the east of the East Giant Buddha and also above Caves B. Caves B1 consist of Cave B1(a), Cave B1(b), Cave B1(c) and Cave B1(d). While Cave B1(a) has a rectangular plan, Cave B1(c) has a square plan. Cave B1(b) is a forecourt shared by Cave B1(a) and Cave B1(c). The stairway to the west of Cave B1(a) and Cave B1(b) leads up towards Cave B1(d).

Form: Square plan; domed ceiling; tambour. This cave is composed of a square plan, the first cornice with an almost square shape, a round tambour, a round second cornice, and a domed ceiling in that order. The axis is east–west and parallels the cliff.

Technique and design: The side walls incline. Each wall has three niches, except for the western side, which has an entrance. These are long vertical niches reaching the lower end of the first cornice. The bases of all the niches are ca. 30 cm high from the floor. The niche at the centre is always wider than the other two, and fixed with a pedestal. The shapes of the niches are geometrically inaccurate. Some hollows are confirmed at the four corners, which suggests that irregular-shaped niches were produced using the corners. It is unclear if some statues were installed in the niches because mortises to support statues are not found here as they are in the other caves.

While the first cornice has slightly round edges at the four corners, the side walls are square. This causes each of the four re-entrant angles to have a base in the shape of a triangle. The tambour inclines and characteristically holds niches at the four corners. The upper parts of these niches are thrust into the sphere above the second cornice. The tops of the niches are decorated with triple edgings. There are decorations made by rammed earth that represent posterodorsal walls on the back walls of the niches, as well as the surrounding walls. It is reasonable to assume that the niches at the four corners of the tambour functioned as a transitional piece from the square plan to the dome (Figs 285, 286). These niches at the four corners are unique to this cave in the Bamiyan site as are the niches at the corners of the side walls. There is a possibility that this cave used to be decorated with mural paintings although it is now unclear.

Present condition: There are several traces of restoration works inside the cave, especially on the fragmentary remains of clay wall. The repair works also seem to have been thoroughly executed in the forecourt. A possible doorframe has been found around the entrance, as viewed from the forecourt (Fig. 288). The wall to the right of the entrance contains a crack that reaches the outside wall (Fig. 287).

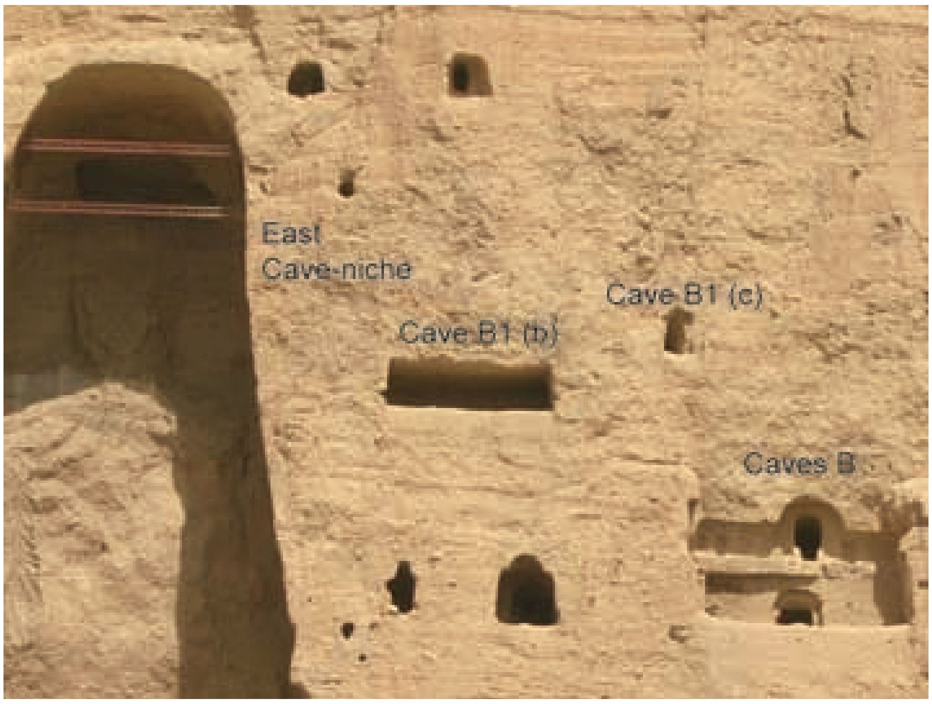


Figure 280 Cave B1(c): façade.

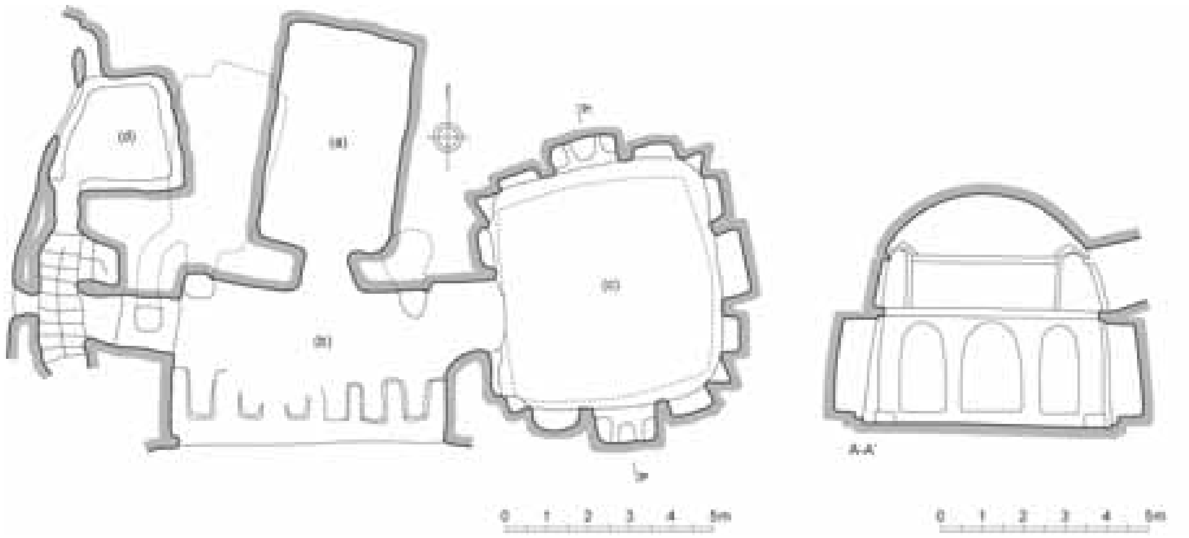


Figure 281 Caves B: plan. Cave B1(c): section (after Kodera *et al*. 1971).

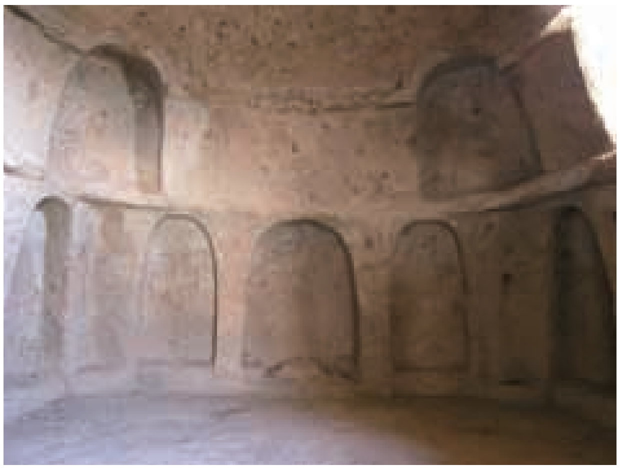


Figure 282 Cave B1(c): eastern side.

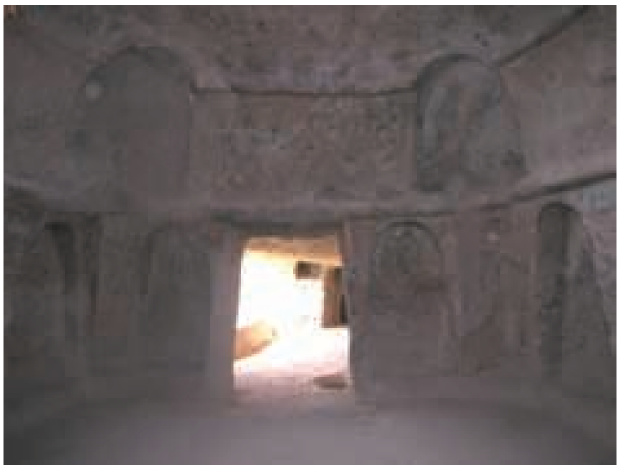


Figure 284 Cave B1(c): western side.

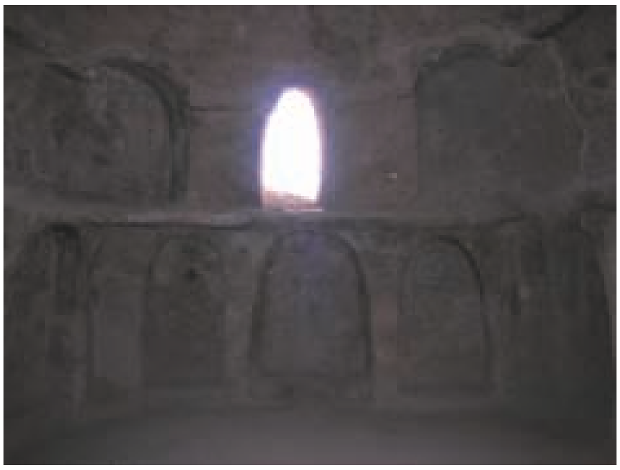


Figure 283 Cave B1(c): southern side.

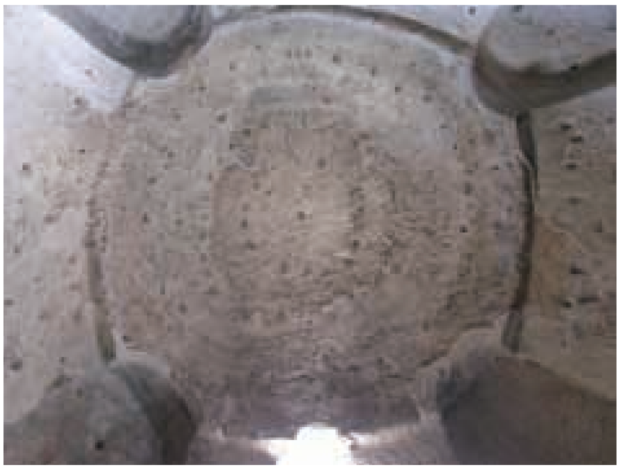


Figure 285 Cave B1(c): ceiling.

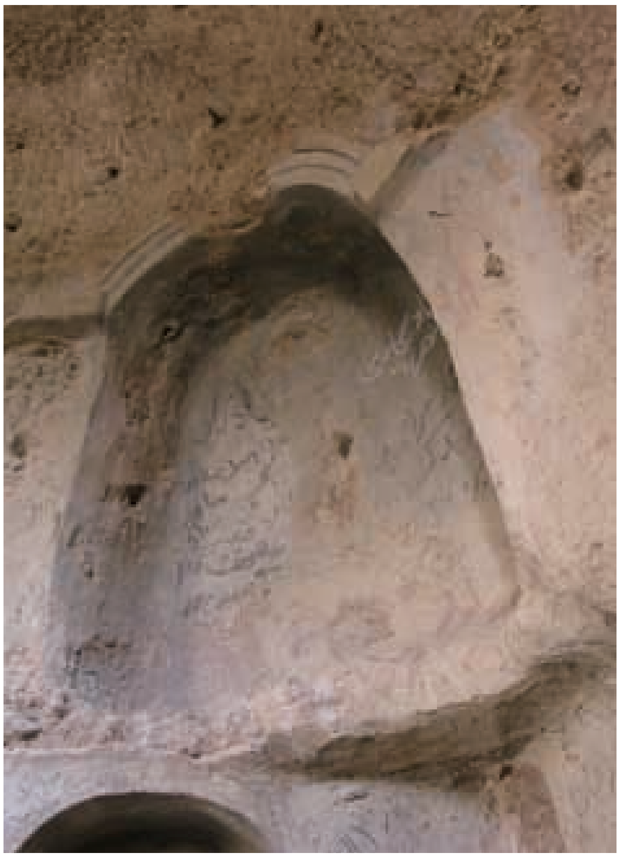


Figure 286 Cave B1(c): niche on the tambour.

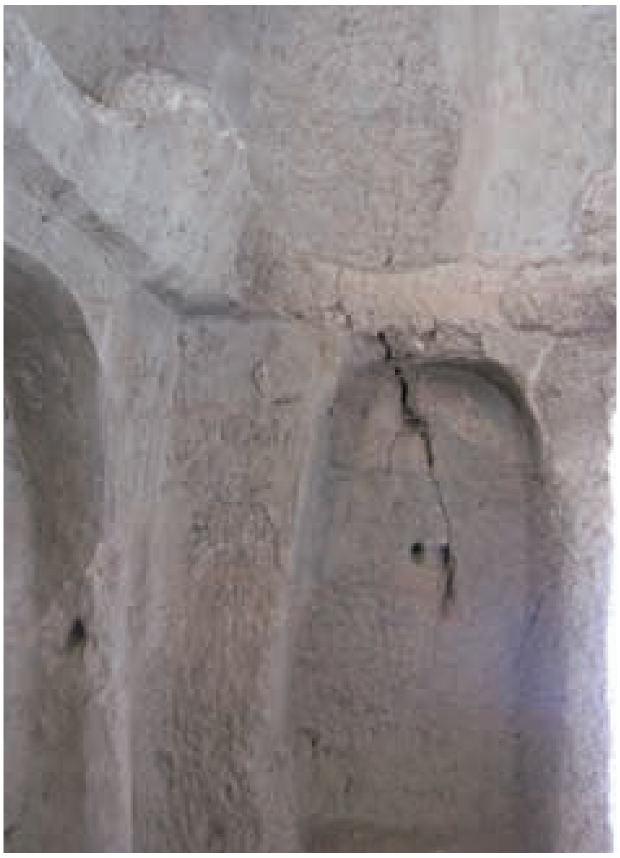


Figure 287 Cave B1(c): crack on the side wall.

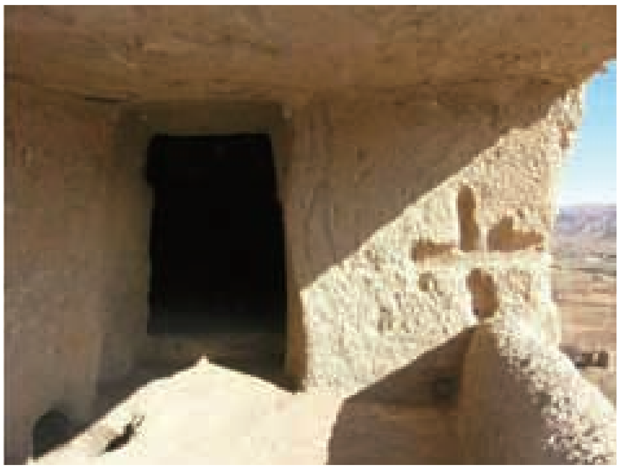


Figure 288 Cave B1(c): entrance and eastern side of the forecourt.

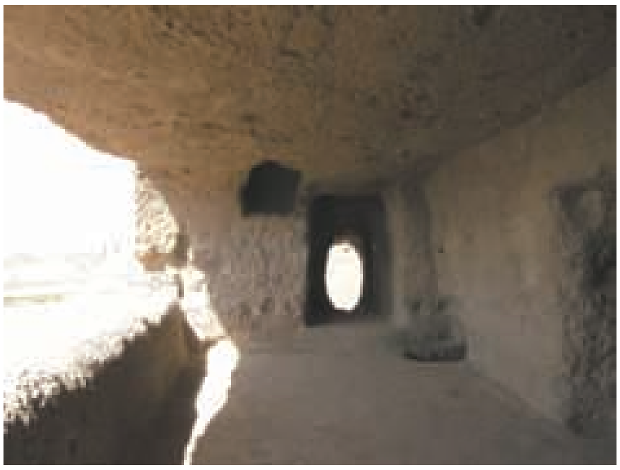


Figure 289 Cave B1(c): western side of the forecourt.

The East cave-niche

Location: The East cave-niche is located in the middle of the western side of the Great Cliff in Bamiyan.
Form: The cave-niche is about 20 m deep, 15 m at its widest point and about 35 m high. There are seven similar caves that were dug near the feet of the Buddha, at the bottom of the cave-niche. There is a step corridor in the solid rock that starts at the feet of the Buddha and leads to the head of the Buddha on one side, and back to the bottom on the other, thus providing a three-dimensional tour around the cave-niche. The branches of this step corridor provide access to Caves A, which are located in the western side of the cave-niche, and Caves D, which are located in the eastern portion of the cave-niche. As such, the cave-niche and the surrounding caves form a cave complex, whose parts are organically connected. There are open spaces in the sides and back at the height of the head, which provide a view into the interior of the cave-niche (Figs 296–298).
Technique and design: The step corridors in the solid rock of the side niches, which continue to the head of the Buddha, climb very high, with many quick turns, making for a steep ascent or descent line. This vertical step corridor, with its access to different levels, is thought to have functioned as a three-dimensional pilgrimage route that worked its way around the cave-niche. There are terrace-like spaces on the sides of the top part of the cave-niche. These spaces feature visible grooves, six on the western side and seven on the east side. These grooves end as holes in the rock face, which are thought to have been used to fix wooden beams that supported a cantilever terrace (Fig. 297). There are seven unique caves around the base of the Buddha; these caves have octagonal, square and circle plans, and they all have different interior design forms.
Present condition: Because of the explosion in 2001, the Buddha was destroyed and the niches around the feet of the Buddha were seriously damaged (Figs 293–295). However, thanks to the conservation project undertaken by ASI in the early 1970s, the collapse of the cave-niche and the step corridor was avoided. During this conservation project, the buttresses, which support the cracked side walls of the cave-niche, were reinforced and conservation work on the step corridor was performed. Pieces of the demolished Buddha are now being collected and the cracked solid rock is in the process of being reinforced as part of a conservation campaign undertaken by UNESCO.

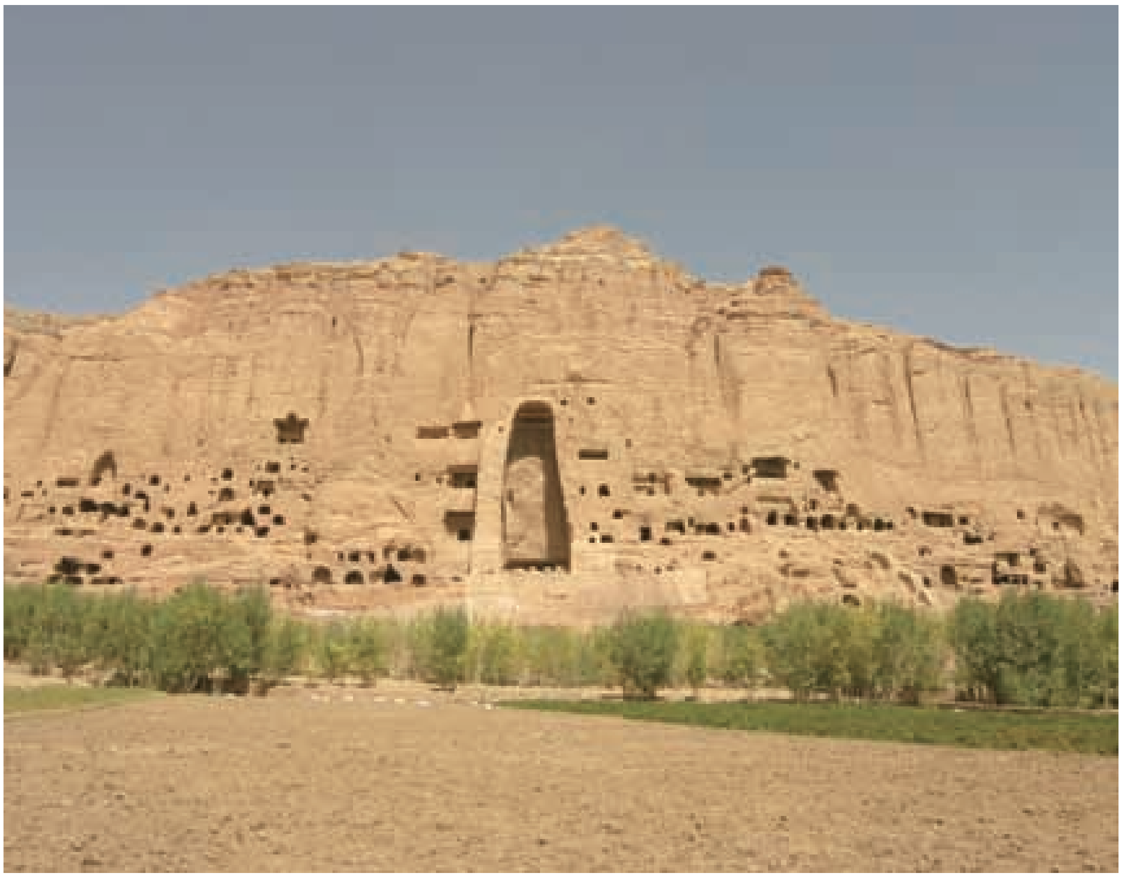


Figure 290 The East cave-niche.

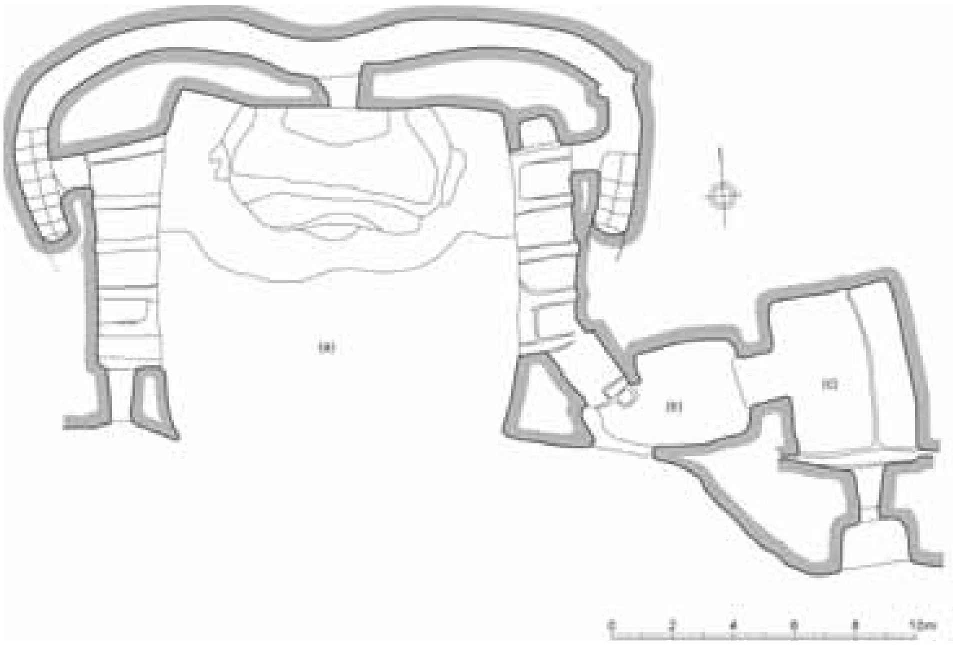


Figure 291 The East cave-niche: plan of the head of the Buddha (after Kodera *et al*. 1971).

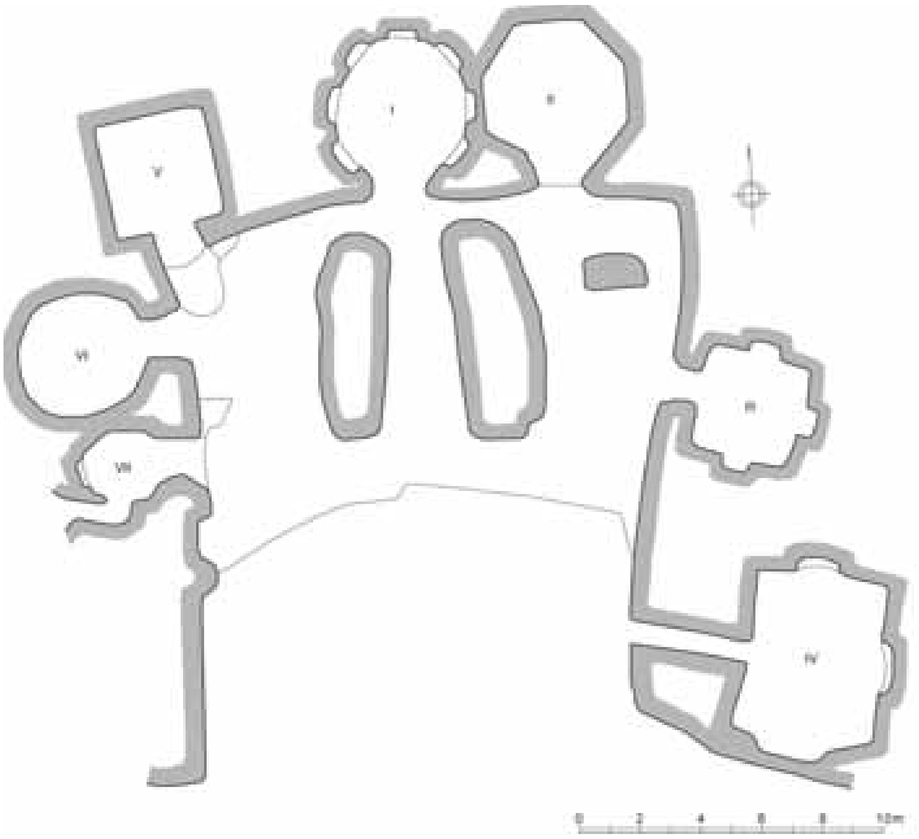


Figure 292 The East cave-niche: plan of the feet of the Buddha (after Kodera *et al*. 1971).

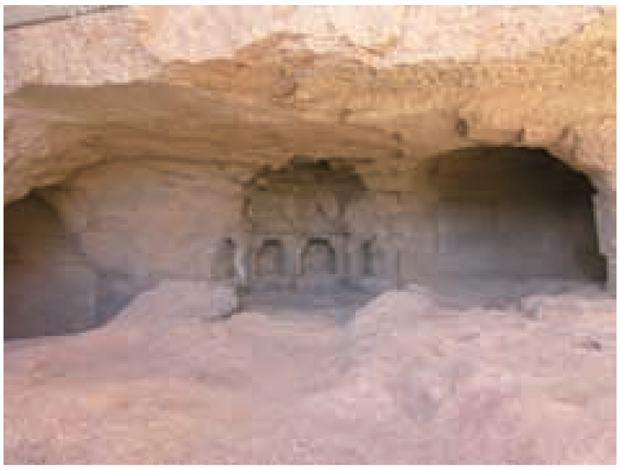


Figure 293 The East cave-niche: the northern feet of the Buddha.

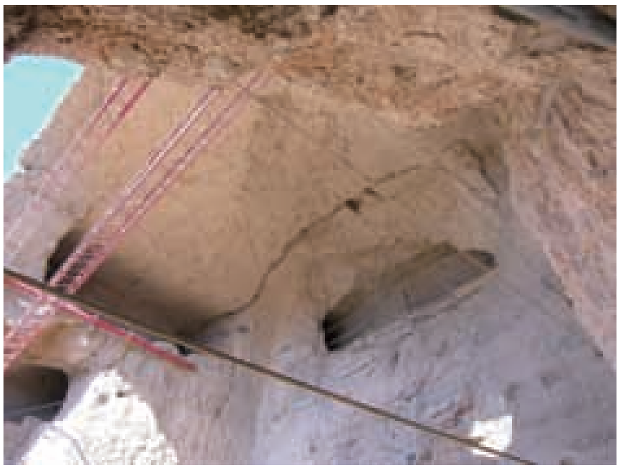


Figure 296 The East cave-niche: the northwestern side of the upper part.

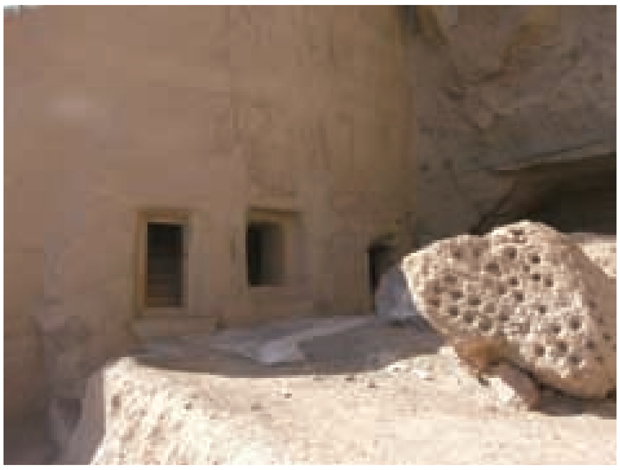


Figure 294 The East cave-niche: the western part of the Buddha.

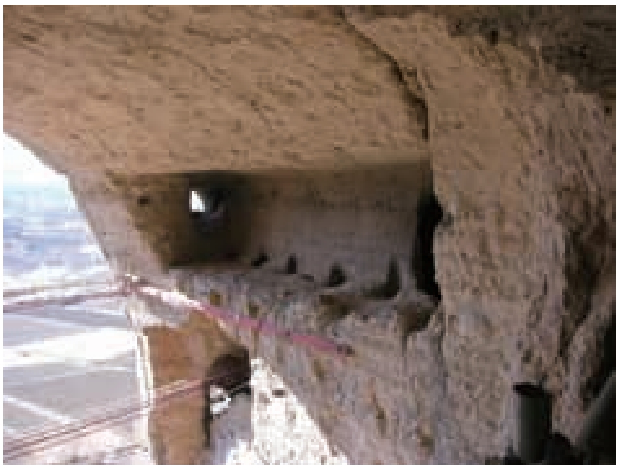


Figure 297 The East cave-niche: the western side of the upper part.

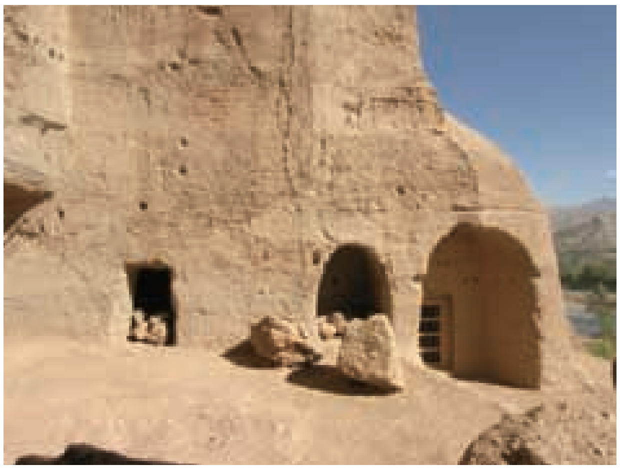


Figure 295 The East cave-niche: the eastern feet of the Buddha.

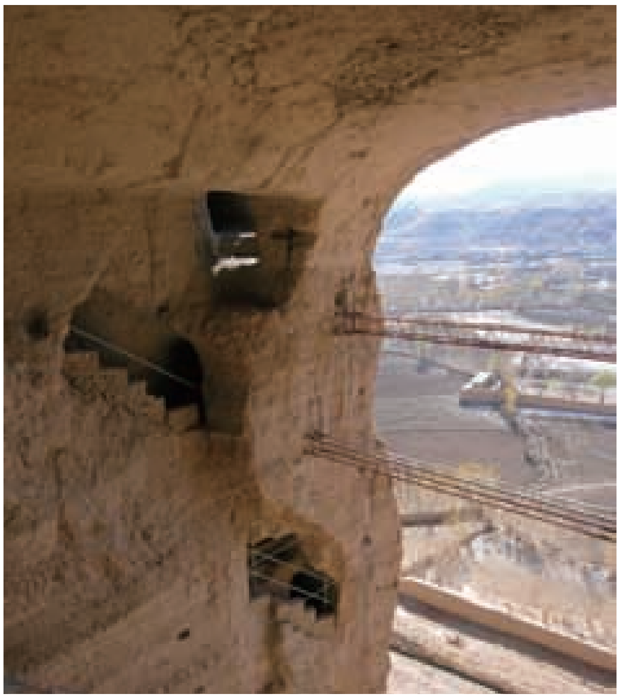


Figure 298 The East cave-niche: the eastern side of the upper part.

Cave 35-I

Location: Cave 35-I is located at the feet of the Buddha and on the centre line of the cave-niche.

Form: Octagonal plan; tambour; first and second cornices; *laternen-decke.* There are niches on each wall. The tambour has an octagonal shape and each face has a trefoil arch. Compared to the other tambours in Bamiyan, this one is relatively high, and its inclination towards the inside is gentler. The *laternen-decke* on the ceiling was built on the cornice, which has three layers.

Technique and design: Since there are mortises in the side wall niches and the trefoil arches in the tambour, it is thought that statues were installed in these positions. There are reliefs around the trefoil arches. However, there are no remnants of reliefs around the niches on the side walls. A three-dimensional design is observed on the *laternen-decke*, composed of beams assembled on the ceiling using rectangular timbers.

This cave is small in size but is full of decorative elements.

Present condition: Because of the explosion, more than half of the cave on the southern side was destroyed and a section of the cave wall is now visible. Iron bars, which were installed by ASI to reinforce the structure, have been exposed in the collapsed part (Fig. 305). There is little remaining of the clay that once covered the surface of the walls and the ceiling. This cave is a good example of the damage inflicted by the civil war in Bamiyan. There is a crack in the rock that runs east to west from the cave-niche all the way through the middle of the cave ceiling in Cave 35-I. Moreover, a significant number of cracks can be observed in the remaining surface and niches. Small rocks are continuously falling from above this cave, clearly creating a dangerous situation.

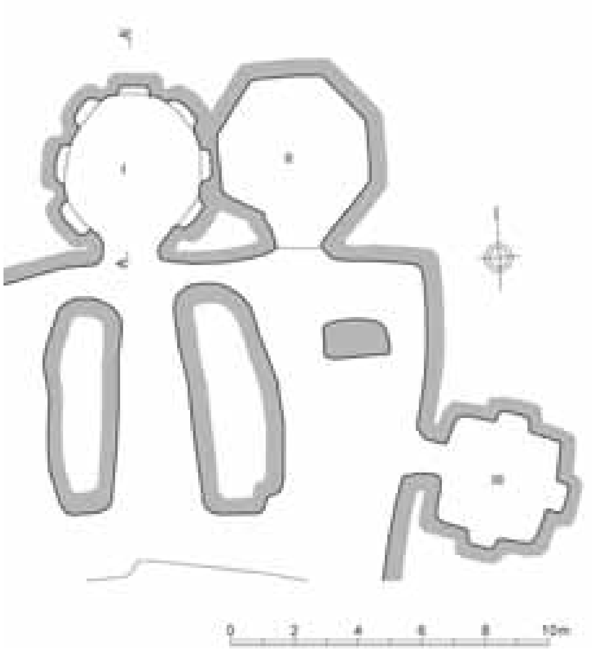


Figure 299 Cave 35-I: plan (after Kodera *et al*. 1971).

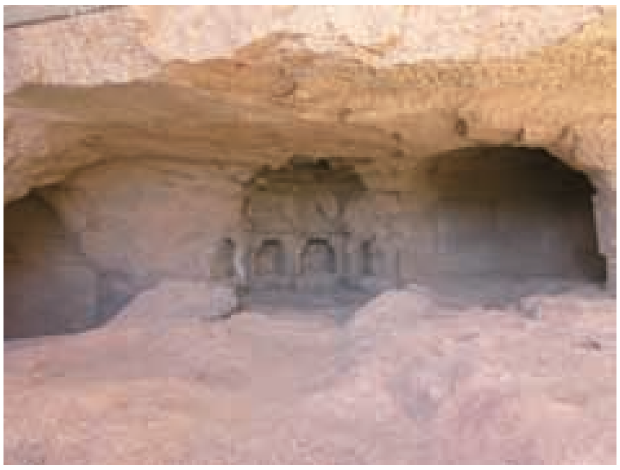


Figure 301 Cave 35-I: general view.

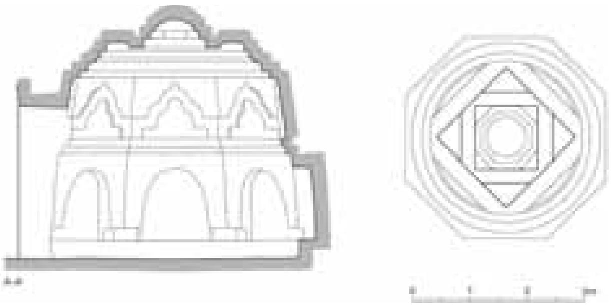


Figure 300 Cave 35-I: section; the *laternen-decke* (after Kodera *et al*. 1971).

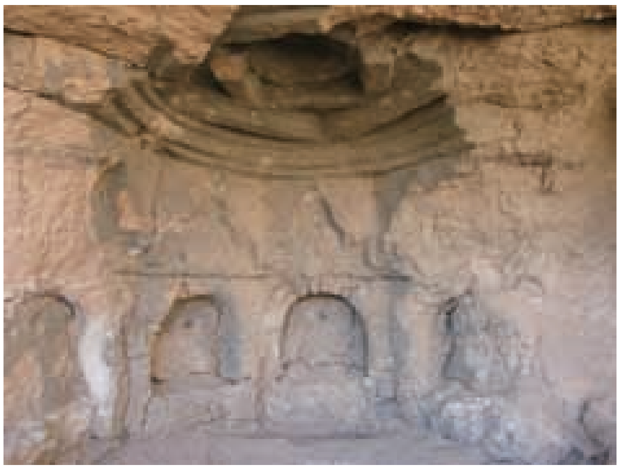


Figure 302 Cave 35-I: north side.

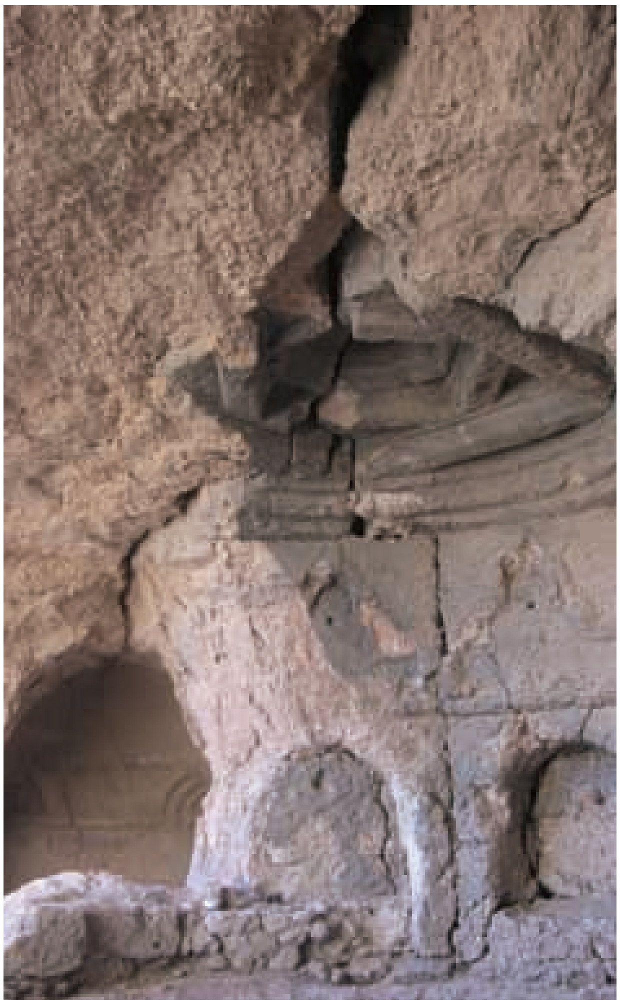


Figure 303 Cave 35-I: western side.

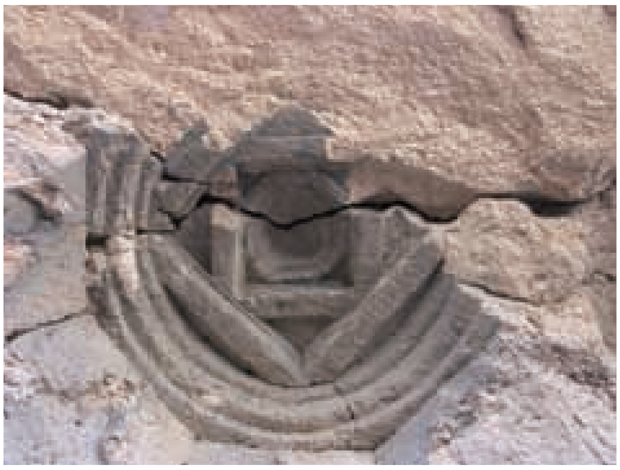


Figure 304 Cave 35-I: ceiling.

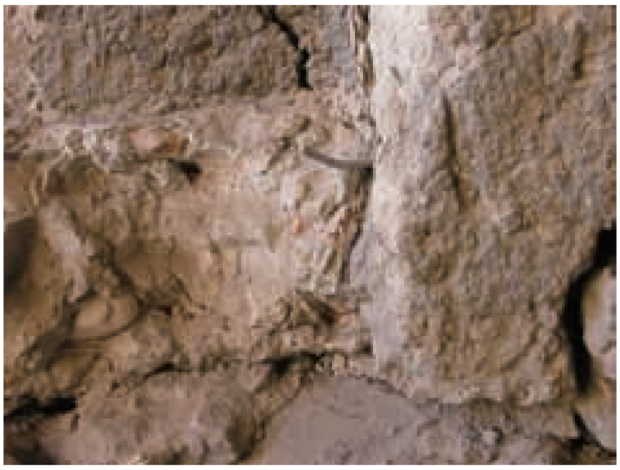


Figure 305 Cave 35-I: exposed reinforcing bars.

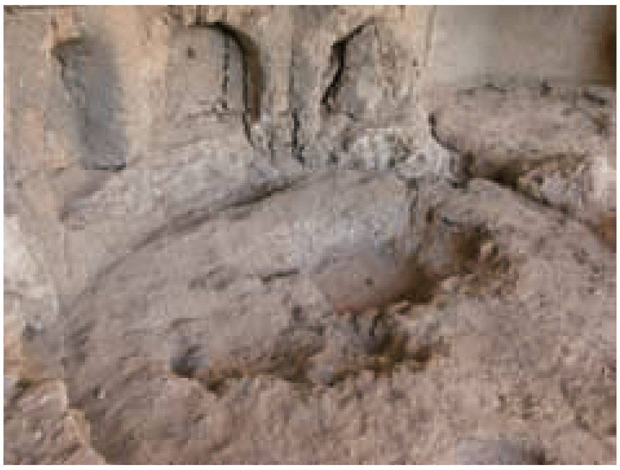


Figure 306 Cave 35-I: floor.

Cave 35-II

Location: Cave 35-II is located at the northeast edge of the feet of the Buddha, on the eastern side of Cave 35-I.
Form: Octagonal plan; tambour; cross-vaulted ceiling.
Technique and design: The side walls are simple and there are no remains of a three-dimensional design, even in the mortises. There is a ridge towards the inside of the cave where the tambour begins. The ceiling of the tambour is decorated with two shallow circular ditches. It is believed that there was another hexadecagonal decoration around these ditches. Carved in the centre, between the circular ridges, there is a cross-vaulted ceiling (Fig. 312). The cross itself is formed by two half-circular spaces that have been carved out, and in the middle of the cross a small dome is carved out.

The four blocks produced by the cross-vault division also have small domes carved into them. There is no trace of a bench-like pedestal in this cave.
Present condition: The explosion destroyed most of the cave and today only the northeastern side remains. The shape of the ceiling can still be observed, however, there is a large hole in the floor. A part of the ceiling is still covered in the clay that originally covered the surface of the walls; however, the walls and ceiling have pockmarked surfaces, probably caused by the heat of the explosion. There is a structural crack in the solid rock that starts in the existing eastern wall and runs across the ceiling and into Cave 35-I. There are several cracks of varying size in the cave.

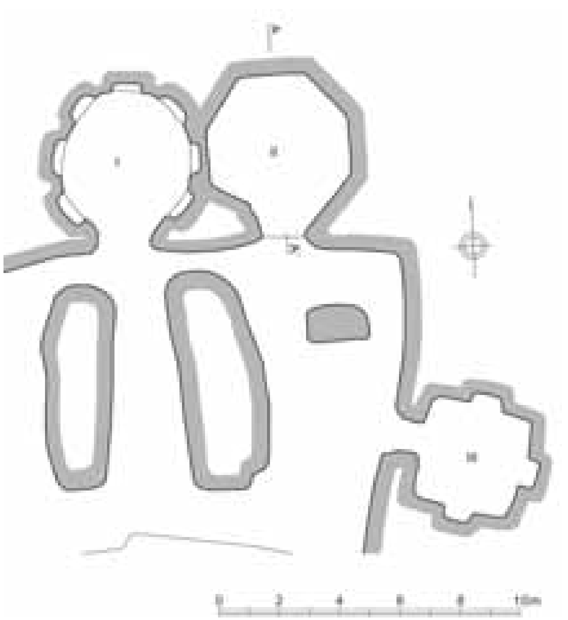


Figure 307 Cave 35-II: plan (after Kodera *et al.* 1971).

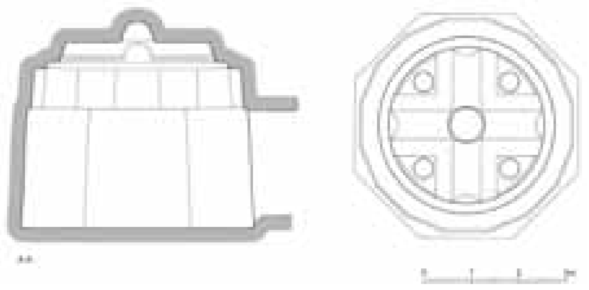


Figure 308 Cave 35-II: section; ceiling (after Kodera *et al.* 1971).

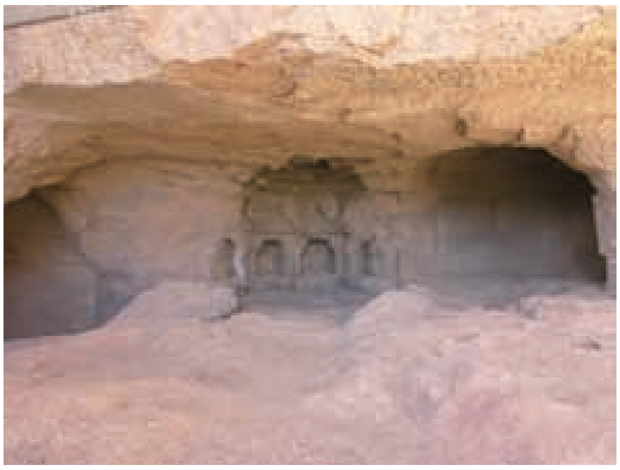


Figure 309 Cave 35-II: general view.

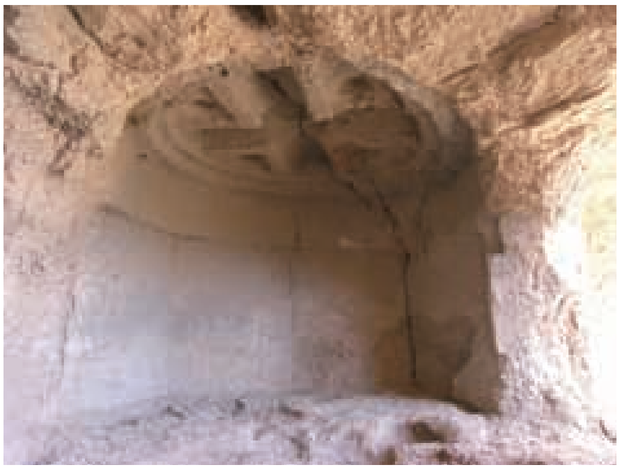


Figure 310 Cave 35-II: eastern side.

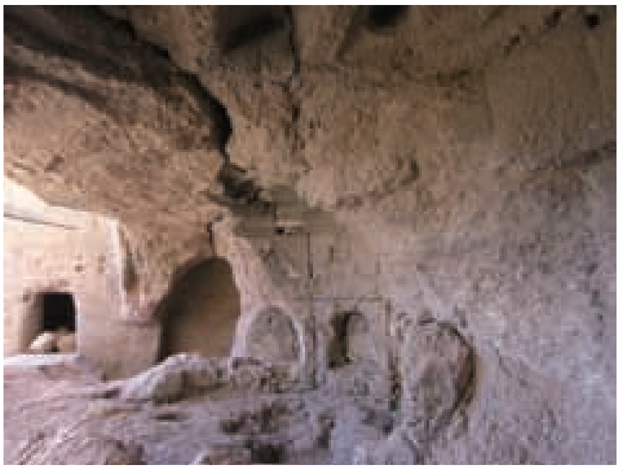


Figure 311 Cave 35-II: western side (the side wall has serious damage).

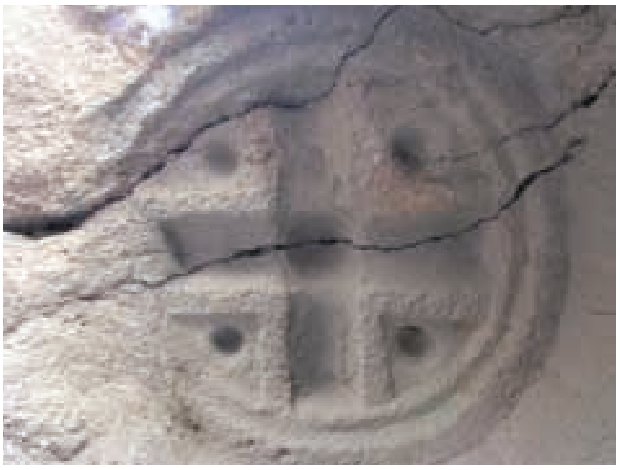


Figure 312 Cave 35-II: ceiling.

Cave 35-III

Location: Cave 35-III is located on the eastern side of the feet of the Buddha and is at the centre of the cave-niche.
Form: Square plan; polygonal tambour; domed ceiling.
Technique and design: There are three niches slightly less than 1 m high on the northern, eastern and southern sides of the cave. They have columns at the corners on both sides, which are carved out of the rock and are about half the height of the niche (Fig. 318). The columns are carved into a cylinder shape and their upper sections are thinner than the lower sections. This cave form, with a square plan and dome structure with columns on each side of the niches, is rare in Bamiyan. There are both small and large mortises placed regularly inside the niches and at the corner of the cave. It is thought that statues were placed in these positions. The tambour is octagonal in shape, without cornices, and its edge is offset in from the wall, just like the dome above it, which extends further in.
Present condition: The pieces of the Buddha are still scattered inside the cave and it is impossible to observe the condition of the floor. The walls have been weathered, but a part of the ceiling still has remnants of the clay which used to cover the surface. There are no major cracks inside the cave.

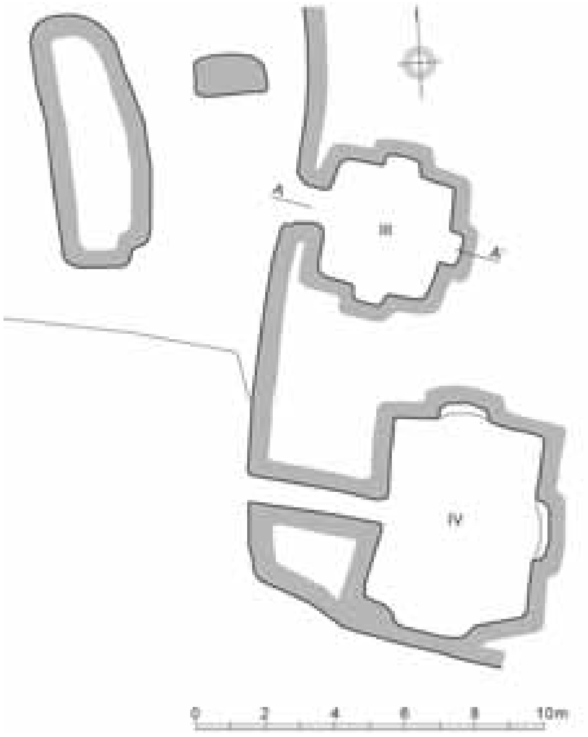


Figure 313 Cave 35-III: plan (after Kodera *et al.* 1971).

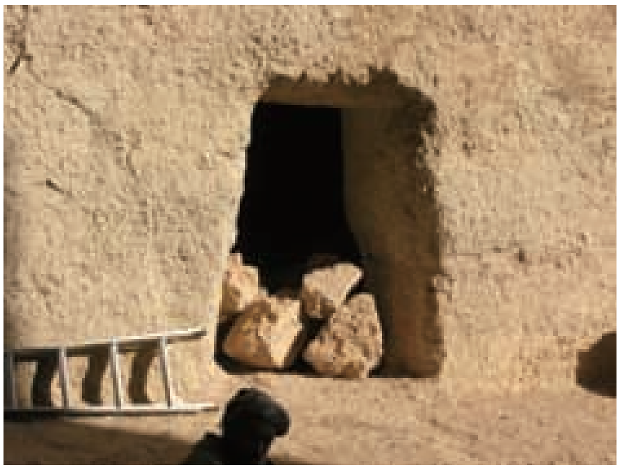


Figure 314 Cave 35-III: general view.

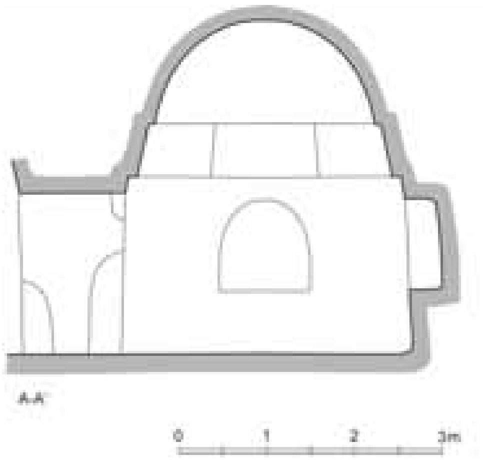


Figure 315 Cave 35-III: section (after Kodera *et al.* 1971).

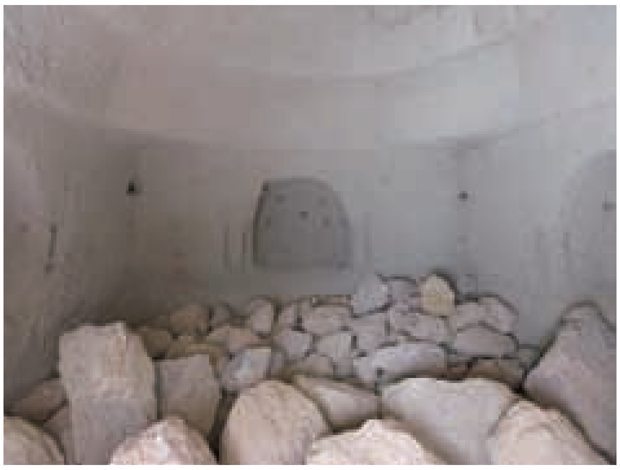


Figure 316 Cave 35-III: eastern side.

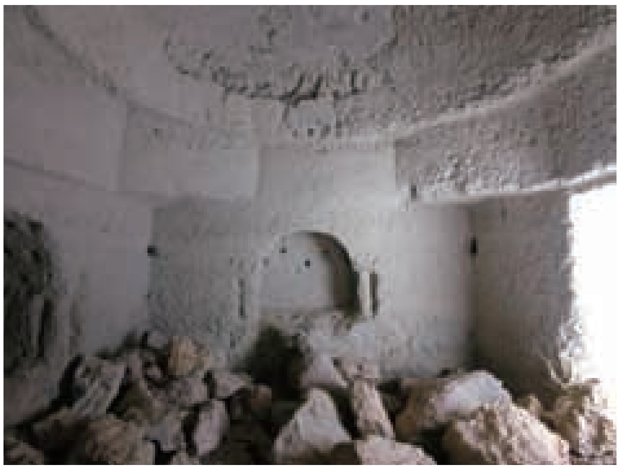


Figure 317 Cave 35-III: southern side.

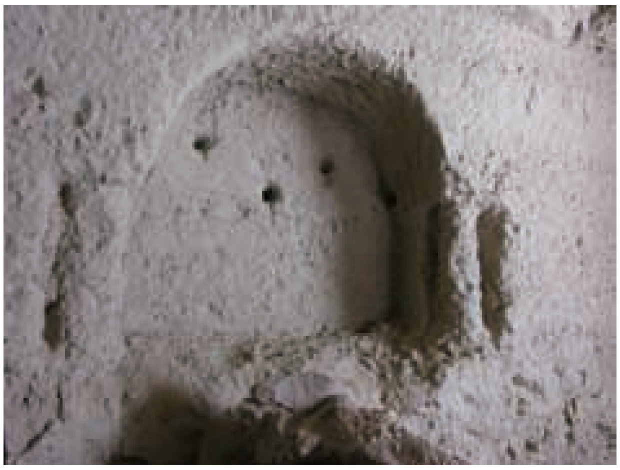


Figure 318 Cave 35-III: a niche with carved columns.

Cave 35-IV

Location: Cave 35-IV is located at the eastern side of the feet of the Buddha and is the cave closest to the surface of the cliff.

Form: Square plan; tambour; two cornices; domed ceiling.

Technique and design: Since the cave has been used recently as a temporary storage for the pieces that were gathered at the cave-niche, the details of the walls and the floor could not be observed. Each side wall has niches. There are triangular surfaces at the corners below the second cornice. Normally, squinches directly support a dome so that a square base can hold a circular dome. However, here the squinches are not deep enough, and the gap between the dome and the squinches is filled by the second cornice (Fig. 319).

Present condition: The top surface layer of clay and Susa still exists on the squinches, below the cornice, and on parts of the walls. The Nagoya University report observed that one-third of the southern section had been renovated.

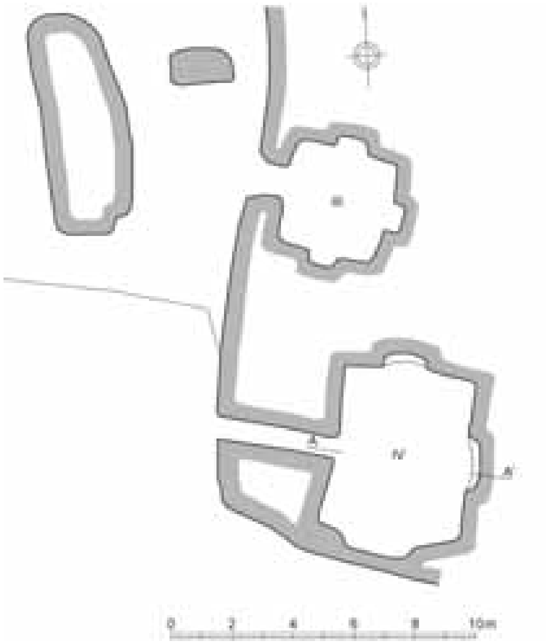


Figure 320 Cave 35-IV: plan (after Kodera *et al.* 1971).

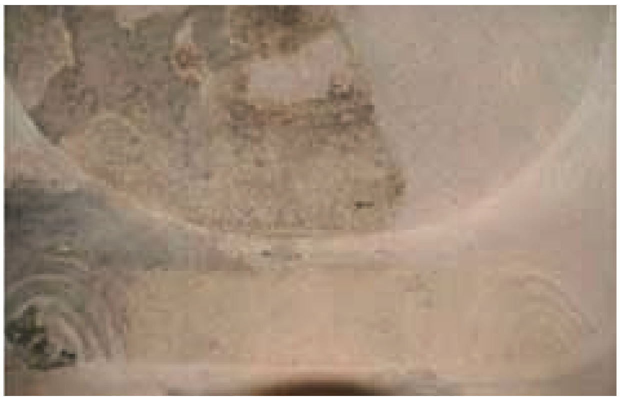


Figure 319 Cave 35-IV: tambour; ceiling.

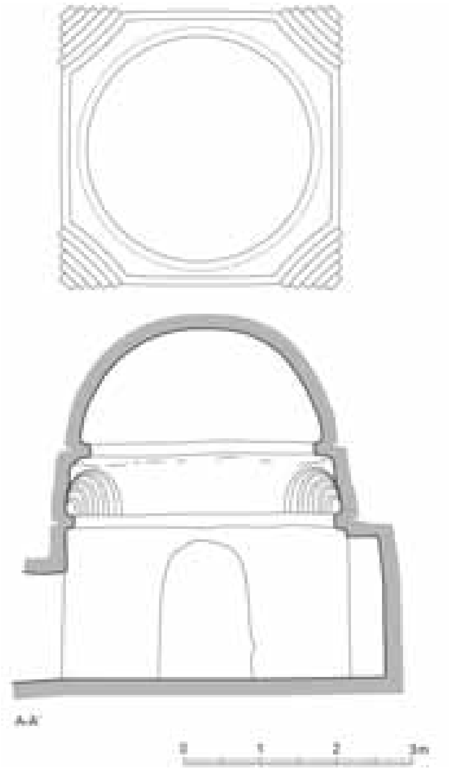


Figure 321 Cave 35-IV: section; ceiling (after Kodera *et al.* 1971).

Cave 35-V

Location: Cave 35-V is located at the northwest edge of the feet of the Buddha.
Form: Square plan; domed ceiling.
Present condition: The cave suffered serious damage from the explosion of the Buddha. The southeastern part of the ceiling collapsed along with the northern and eastern sides of the cave. A large crack crosses the ceiling from east to west.

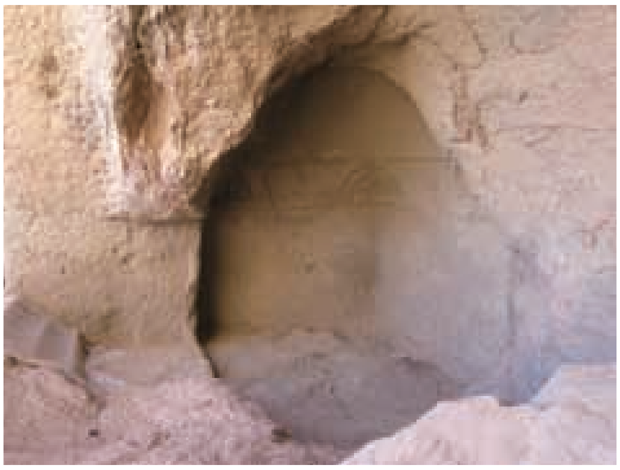


Figure 322 Cave 35-V: general view.

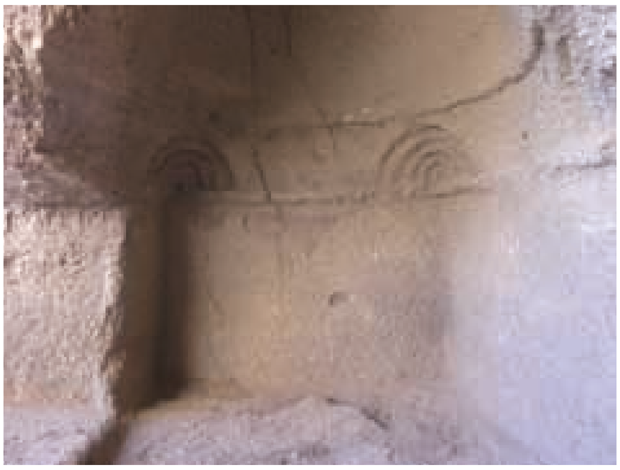


Figure 324 Cave 35-V: southern side.

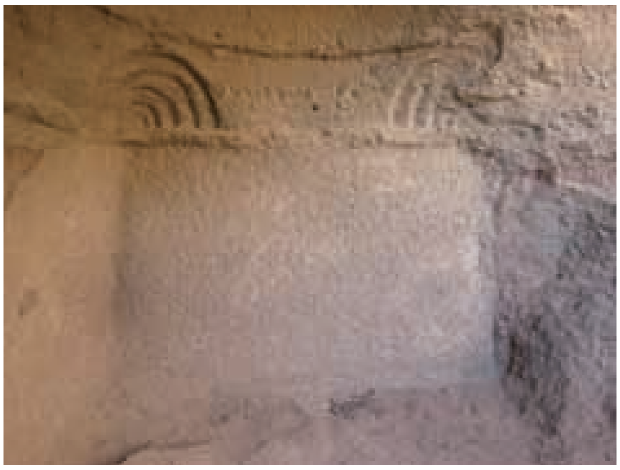


Figure 323 Cave 35-V: northern side.

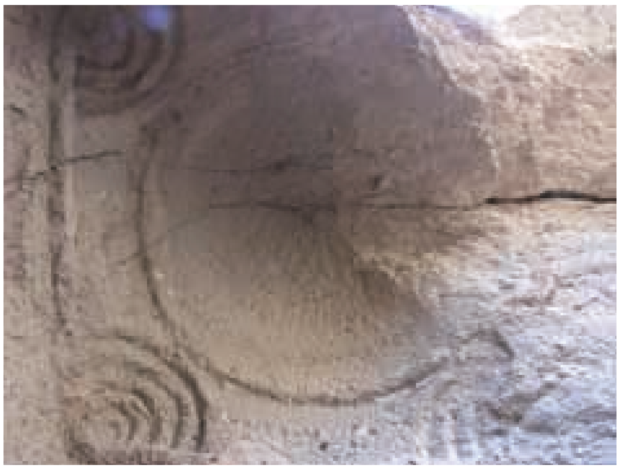


Figure 325 Cave 35-V: ceiling.

Cave 35-VI

Location: Cave 35-VI is located on the western side of the feet of the Buddha and is the second cave from the surface of the cliff.
Form: Square plan; flat ceiling. It is a rare form for the Bamiyan site.
Present condition: A large pile of broken pieces of the Buddha can be found inside the cave. There are many cracks on the flat ceiling and the western side. The condition is very dangerous, especially as the cracks are on the flat ceiling.

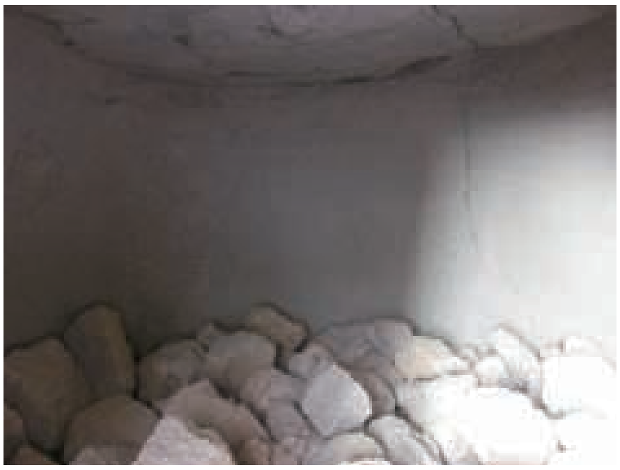


Figure 328 Cave 35-VI: western side.

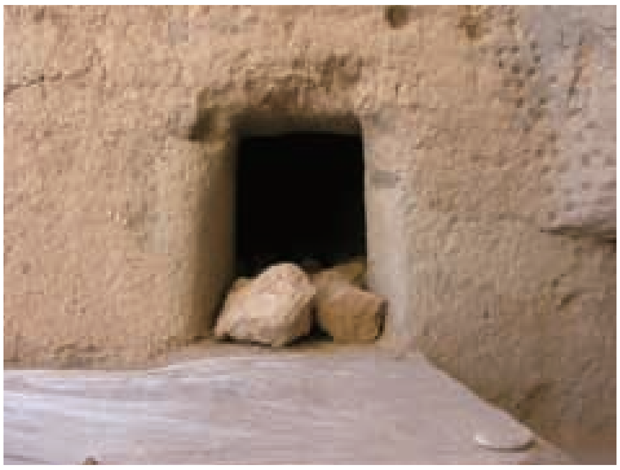


Figure 326 Cave 35-VI: general view.

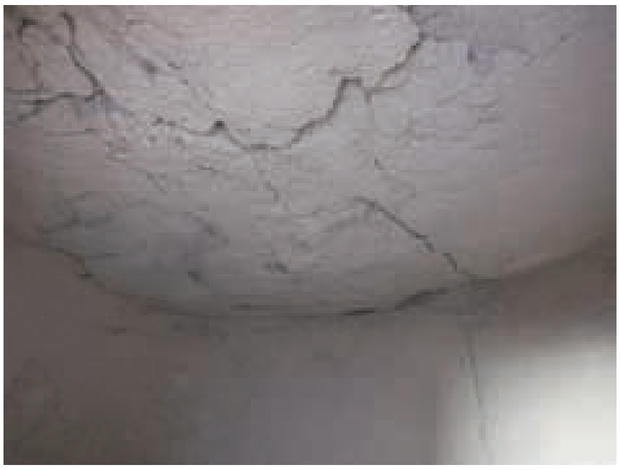


Figure 329 Cave 35-VI: ceiling.

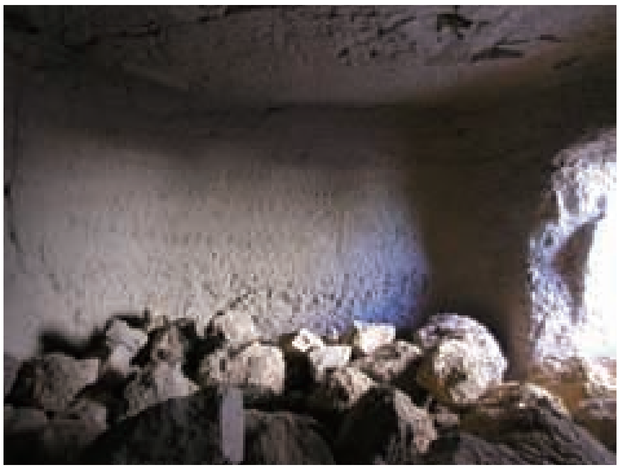


Figure 327 Cave 35-VI: northeastern side.

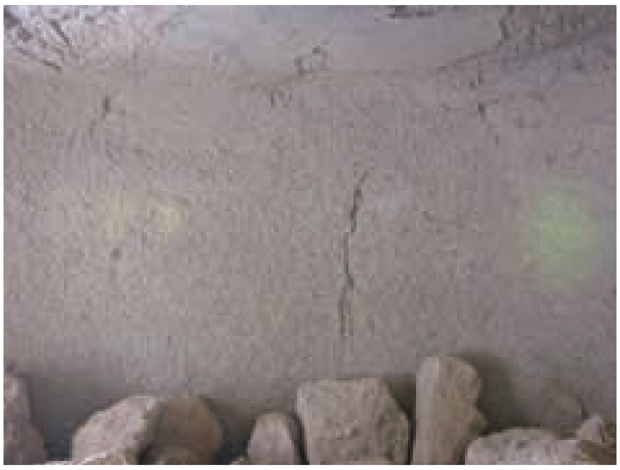


Figure 330 Cave 35-VI: detail of the western side.

Cave 35-VII

Location: Cave 35-VII is located at the western side of the feet of the Buddha and is the nearest cave to the surface of the cliff.
Form: Irregular octagonal plan; domed ceiling. There is a niche in the front of the cave, on the western side.
Present condition: ASI carried out conservation work between the entrance and the buttress, and for this reason it is thought that this cave suffered less damage from the explosion than the caves located in the inner region. However, cracks on the side walls are still observed inside the cave.

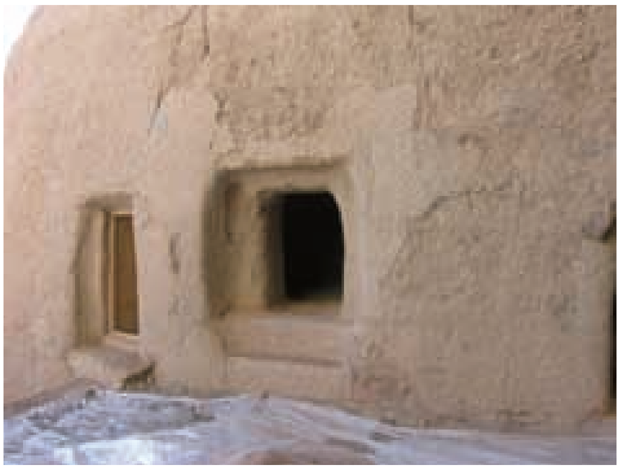


Figure 331 Cave 35-VII: general view.

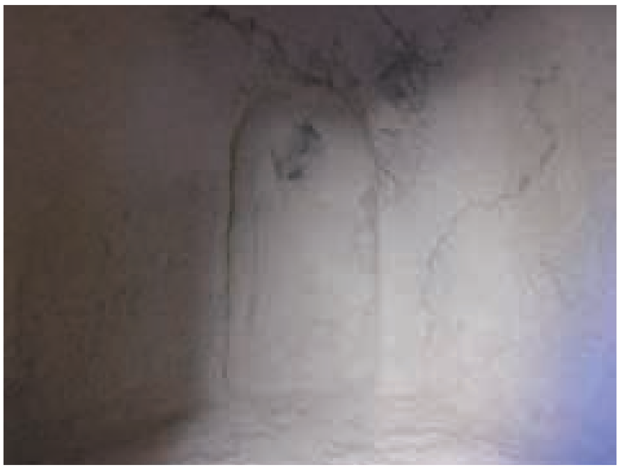


Figure 332 Cave 35-VII: western side.

Caves C(a), C(c)

Location: Caves C are situated halfway up the cliff, west of the cave-niche, at the side of the Buddha's head. The step corridor, which is west of the cave-niche, provides access to these caves. Caves C consist of four caves, Cave C(a)–C(d). Caves C(a) and C(b) have circular plans, Cave C(c) has a square plan, and Cave C(d) is a small rectangular chamber, which is a passage to Cave C(c).

Cave C(a)

Form: Circular plan; tambour; domed ceiling; two cornices. This is the biggest cave among Caves C. It has a circular plan, cornices and a low dome. There are 15 deep niches carved out of the walls.

Technique and design: Since the niches located on the east–west and north–south axes are wider than the others, and they have pedestals and holes for installing decorations around the niches, it is believed that these niches are more important than the others. The other niches also contain pedestals, which are near both the top and bottom of the niche. There are partial remains of painted halos at the tambour between the first and second cornices, and there is a hole at the centre of each halo. The design is thus believed to have been a combination of three-dimensional statues and painting. The first cornice is deep therefore it might have been used as a base for the statues that were fixed on the tambour (Fig. 341). On the other hand, the second cornice is shallow and there are no mortises or niches on the base of the dome above the second cornice.

Observing the design of the walls, niches, tambour and base of the dome, it can be assumed that the walls of the circular space held three layers of statues and paintings. It can also be assumed that the walls were originally covered by wall clay and paintings.

The entrance to the cave, which can be seen from the forecourt, has an arched entryway and a trapezoidal opening (Fig. 342). There are remains of eaves, a threshold and doorframes around the entrance.

Present condition: Very little of the wall clay remains on the surface, but there are clear remains of a rough surface that was carved out with chisels. There are no major cracks inside the cave.

Cave C(c)

Form: Square plan; unfinished dome. The cave features a square plan with rounded corners. There is an opening in the ceiling that contains an unfinished cavity higher than it is wide.

Technique and design: It is assumed that the space is not completed because the plan features a roundish, imperfect shape. The square room, which has unfinished corners, also has a cavity in the ceiling. This cavity is a carved-out, mushroom-shaped space, which is less wide than it is high (Fig. 343). Since the highest part of the cavity is flat, it is believed that the height of the hole had been determined before it was made. The intended shape of the cave is not clear, but remnants of the carving process are visible.

Present condition: The surfaces still show rough chisel marks and the corners remain rounded.

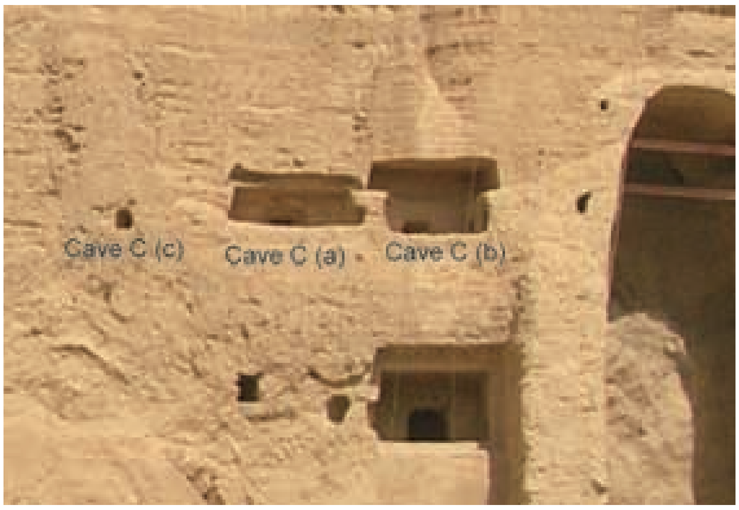


Figure 333 Caves C(a), C(c): general view.

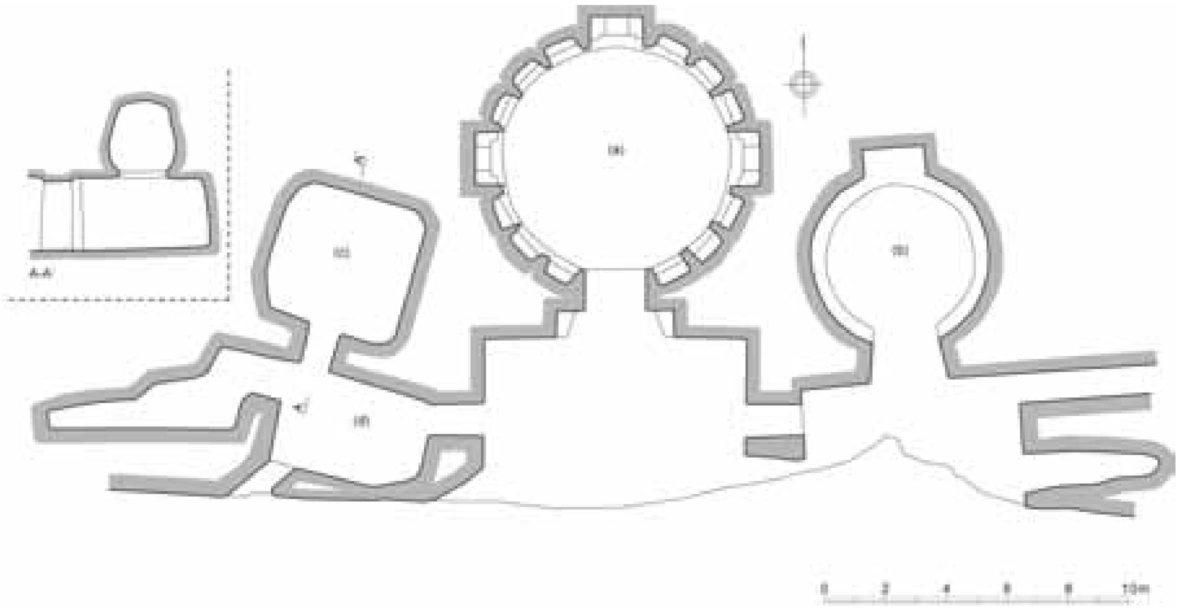


Figure 334 Caves C: plan. Cave C(a): section (after Kodera *et al*. 1971).

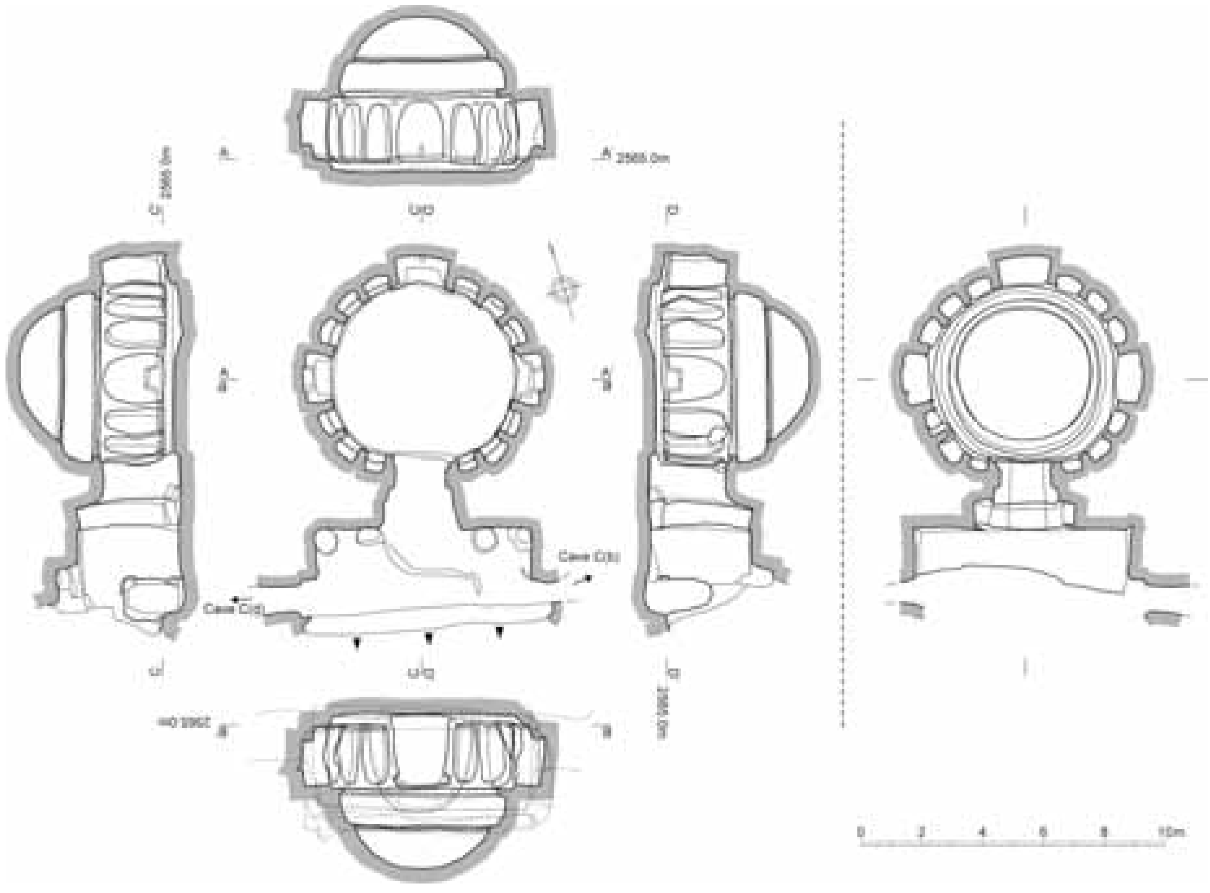


Figure 335 Cave C(a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

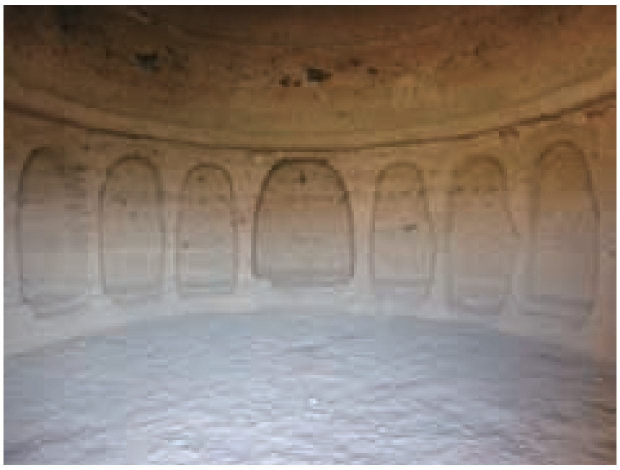


Figure 336 Cave C(a): north side.

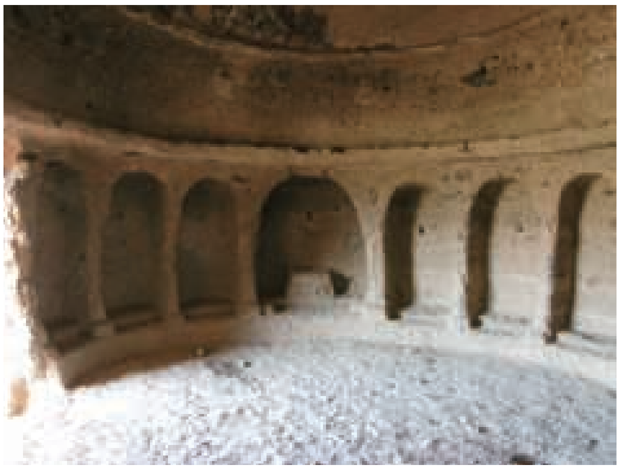


Figure 337 Cave C(a): western side.

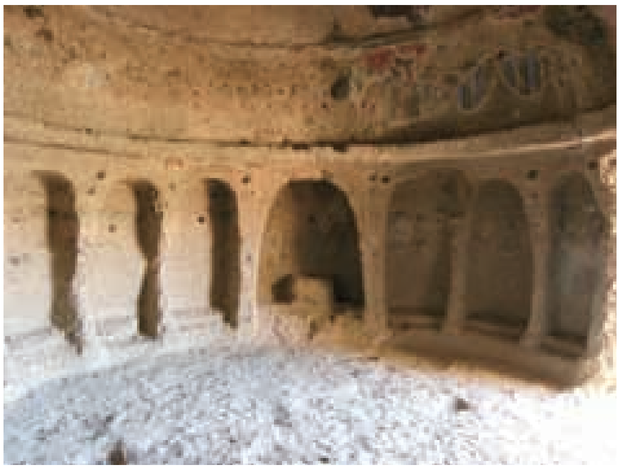


Figure 338 Cave C(a): eastern side.

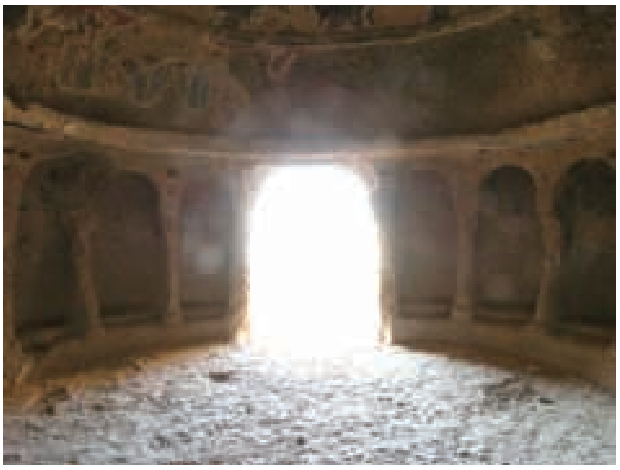


Figure 339 Cave C(a): southern side.

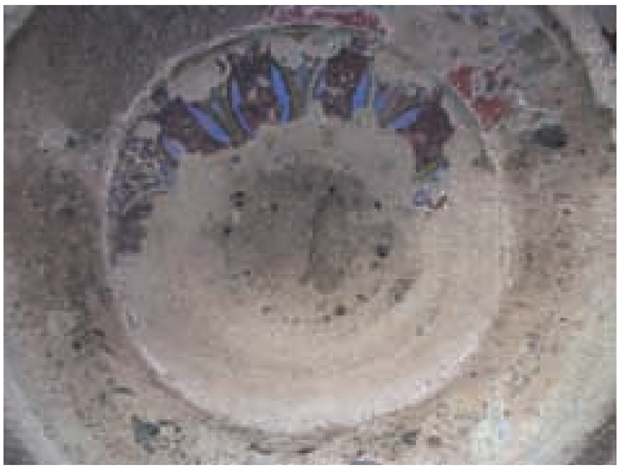


Figure 340 Cave C(a): ceiling.

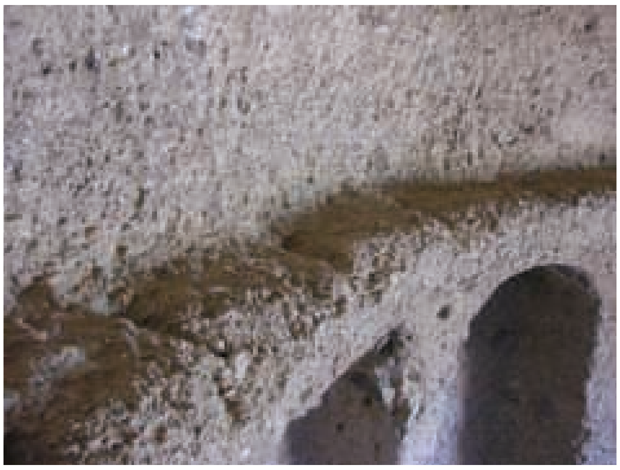


Figure 341 Cave C(a): above the first cornice.

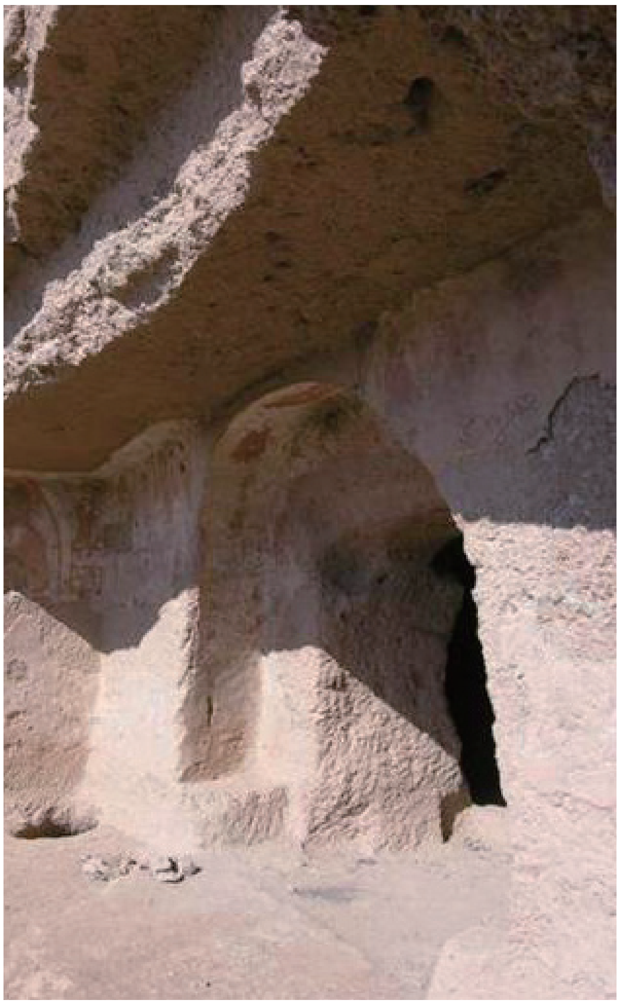


Figure 342 Cave C(a): entrance.

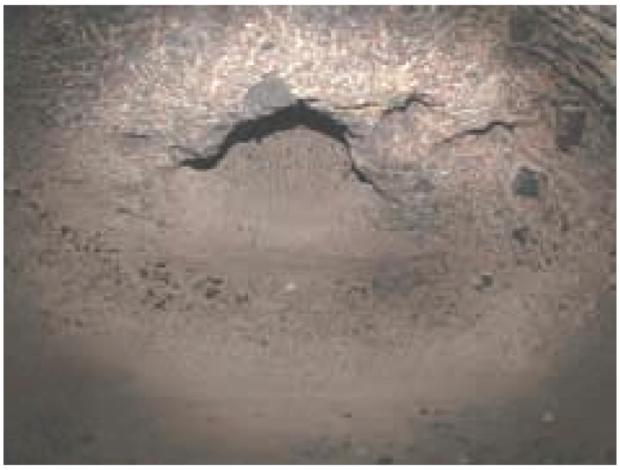


Figure 343 Cave C(c): ceiling.

Cave C(b)

Location: Cave C(b) is located on the easternmost side of Caves C, which are on the western side of the cave-niche.
Form: Circular plan; domed ceiling; tambour; two cornices. The transitional space between the wall and the dome consists of two cornices and the tambour in between. A protruding base, in the form of a bench about 40 cm high, runs around the entire wall.
Technique and design: In contrast to Cave C(a), there is only one niche directly across from the entrance. Since there are regularly aligned mortises, it is assumed that they were used to install statues. Neither cornice is deep. The bottom of the second cornice gradually connects to the wall surface of the tambour. Halos are painted on the tambour and it is believed that statues were installed in full view of the entire cave (Fig. 351). The base of the dome has shallow niches. These niches have mortises and one has wooden tenons (pegs). Between the niches are the remains of pilaster designs consisting of two pillars that were created by modelling (Fig. 352). Two pilasters share a pedestal and a capital that separates the niches. They have three steps at the edges, which are covered with a finishing material that might have held some decorations created by modelling.

There are grooves and steps near the entrance, presumably the remains of a wooden door that was fitted in (Fig. 353). A canopy-like (shelf-like) structure was carved at the north and upper part of the forecourt, which is assumed to have been a passage to the other caves.

Present condition: This cave has more remains of wall paintings than the other caves located near the East cave-niche. There is therefore still a significant amount of wall clay, but most of it has peeled off the side wall. On the eastern side, cracks were observed on the floor, walls and between the dome and the tambour, the widest of which are 5–7 mm. On the forecourt, a crack running parallel with the surface of the cliff was observed on the ceiling of the cave's entrance. Moreover, vertical cracks were found on the cliff side of the passage that connects the eastern and western sides. It is assumed that these cracks are structural, caused by the redistribution of the load from the weight of the cliff when the passages were carved out.

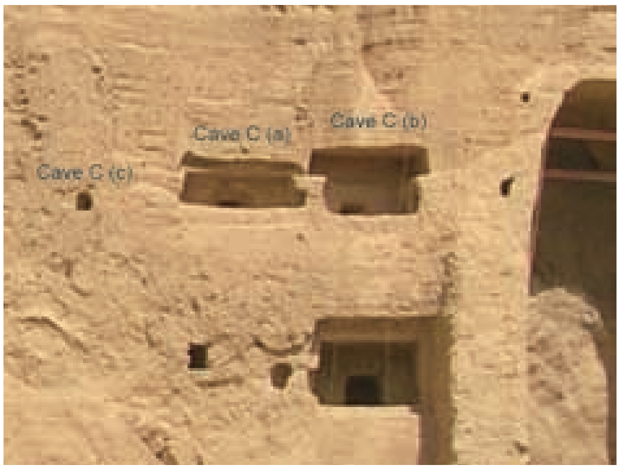


Figure 344 Cave C(b): general view.

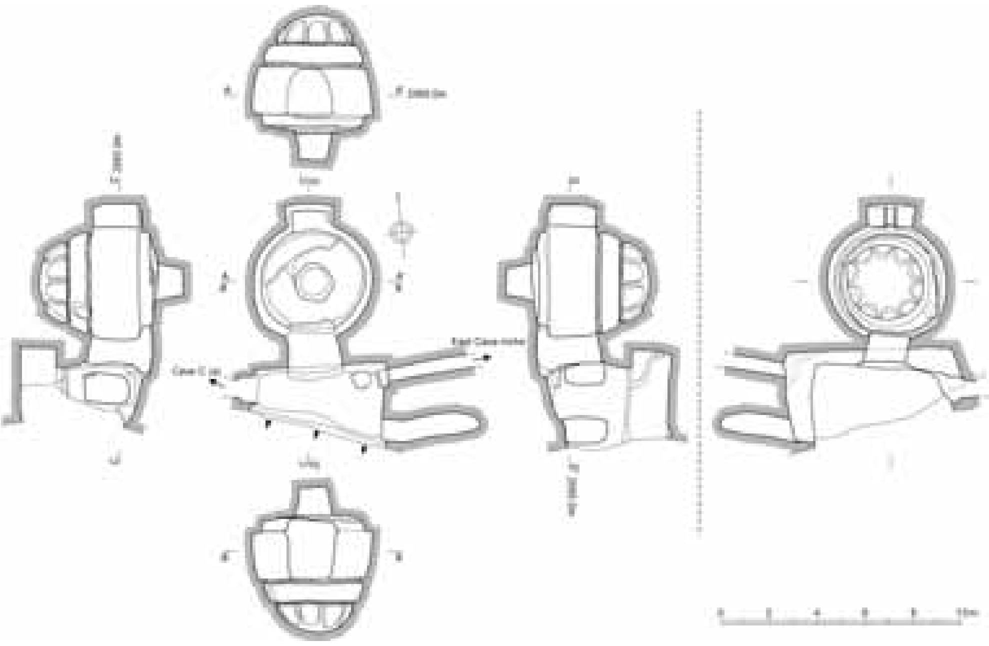


Figure 345 Cave C(b): plan, section; ceiling (measured by PASCO Corporation, Japan, in 2005).

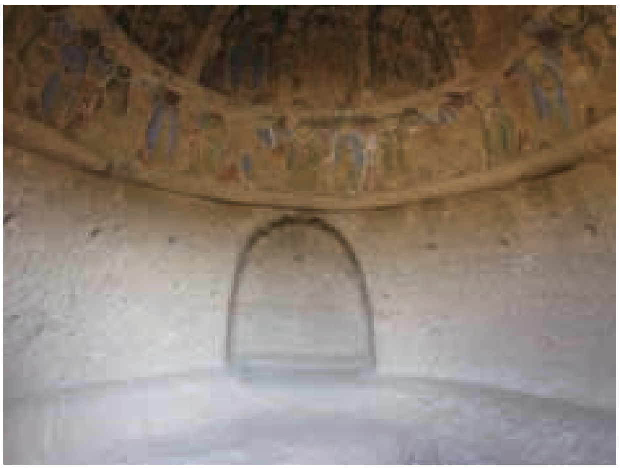


Figure 346 Cave C(b): northern side.

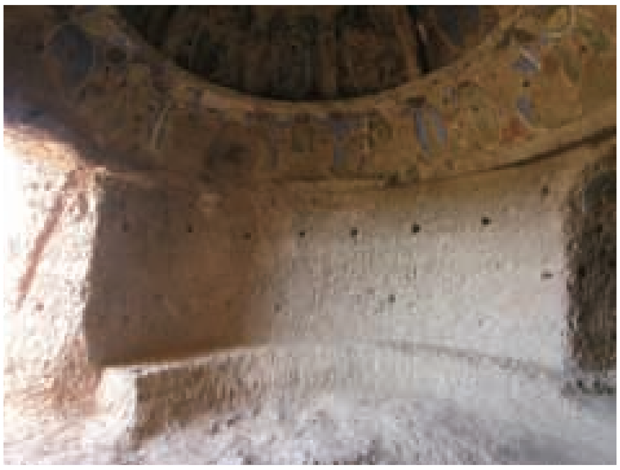


Figure 347 Cave C(b): western side.

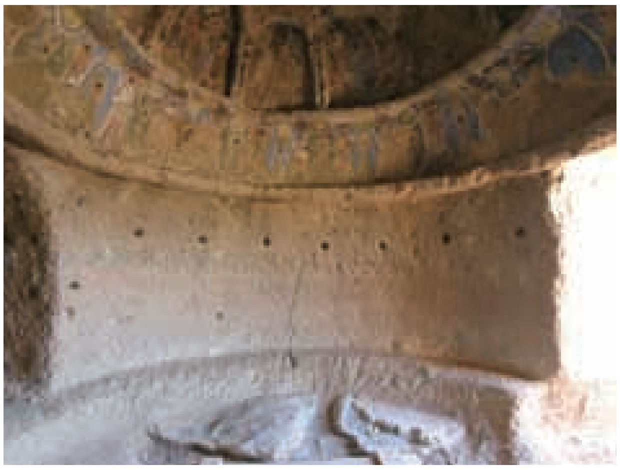


Figure 348 Cave C(b): eastern side.

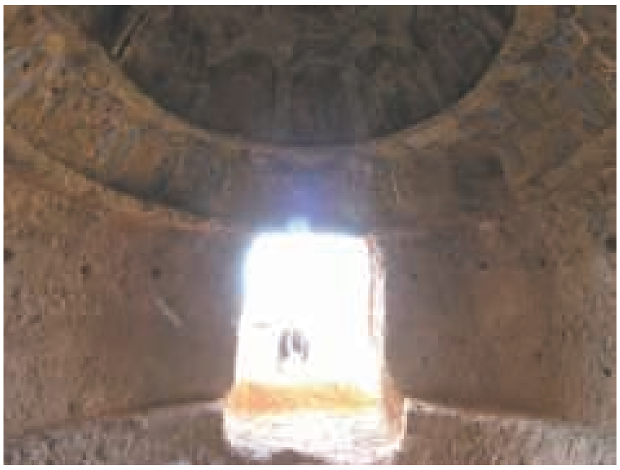


Figure 349 Cave C(b): southern side.

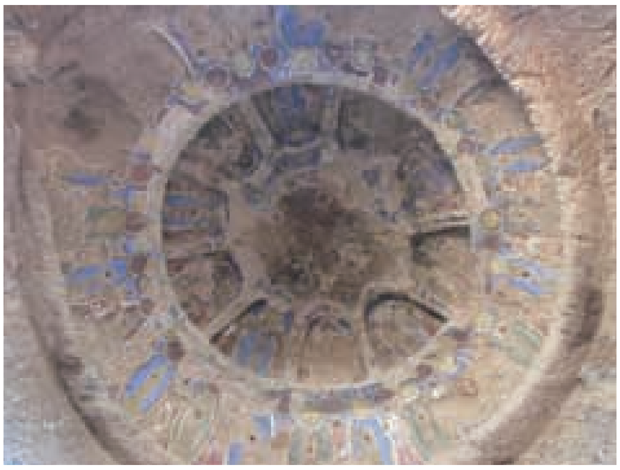


Figure 350 Cave C(b): ceiling.

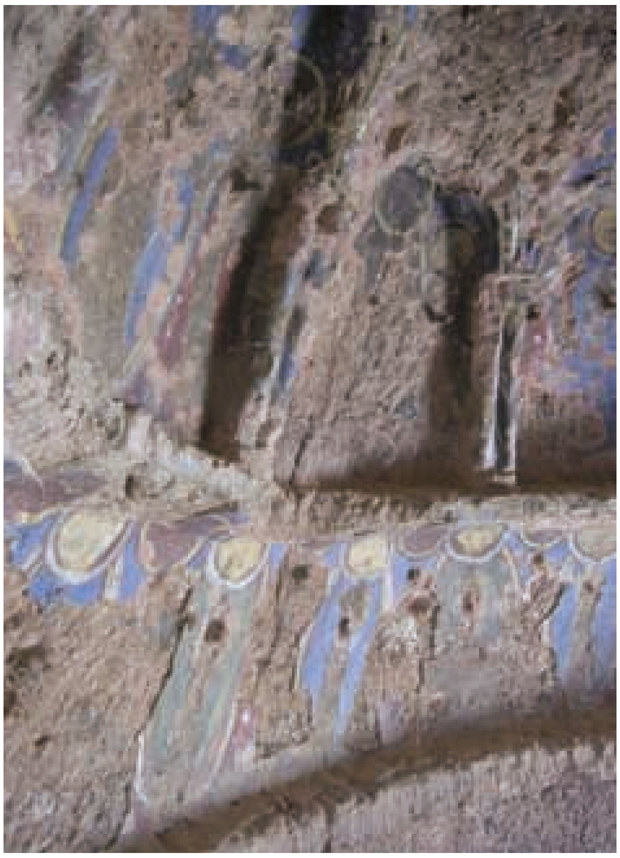


Figure 351 Cave C(b): tambour and columns at the base of the ceiling.

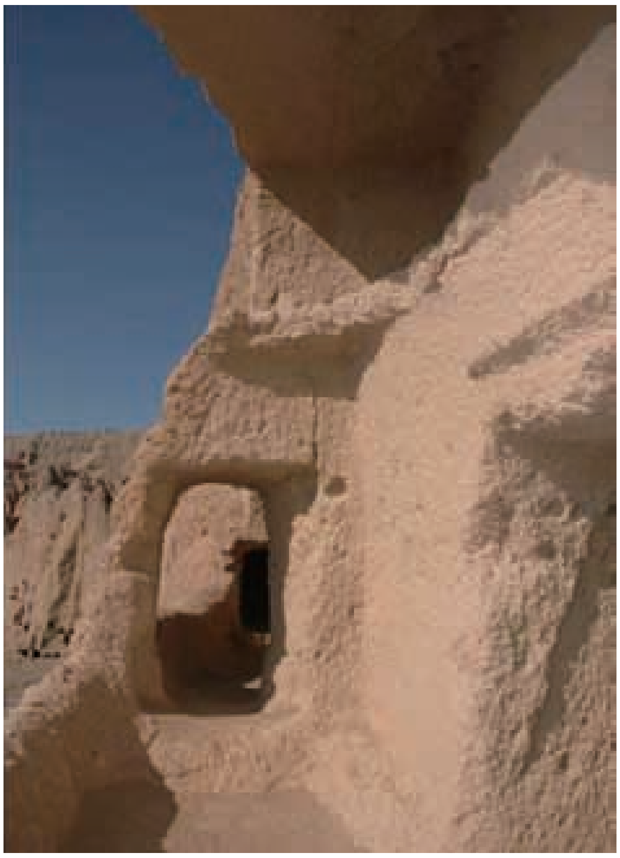


Figure 353 Cave C(b): forecourt.

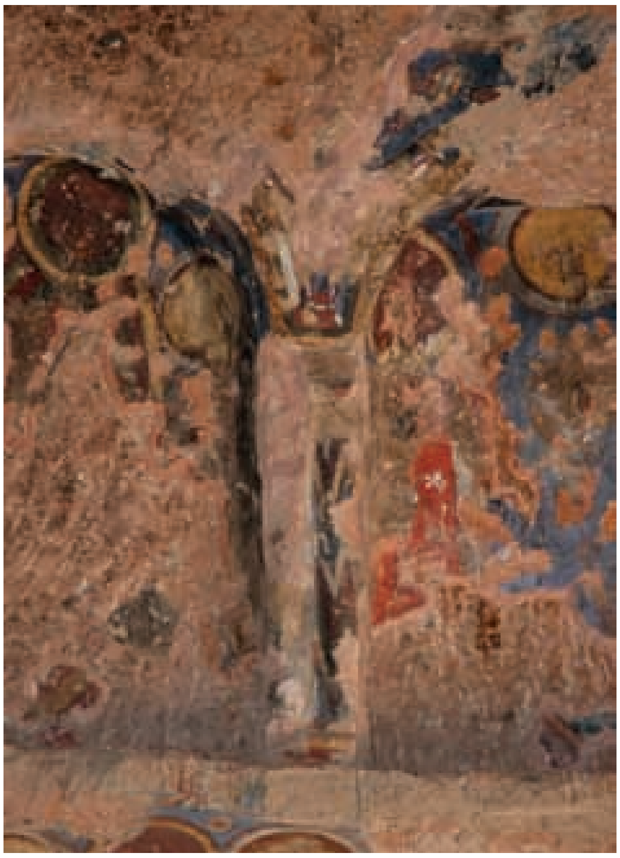


Figure 352 Cave C(b): columns at the base of the ceiling.

Cave D

Location: Cave D is located halfway up the cliff, west of the cave-niche, below Caves C. There is a forecourt south of the entrance, accessible via the east passage.

Form: Octagonal plan; cross-vaulted ceiling; tambour; two cornices. Each side wall has niches. The transitional piece between the wall and the dome inclines gently and consists of two cornices and two tambours. The tambours have rich three-dimensional ornaments.

Technique and design: Since the niches on the walls feature regularly aligned mortises, it is assumed that statues were installed there. Columns might have existed on the lower portion of both sides of each niche because there are grooves at the bases of the niches. However, since the finishes do not exist, it is impossible to specify their design. Based on its finishes, the first cornice looks circular, but the other components, which are missing the finishes, indicate that the cornice was carved out of solid rock in an octagonal plan shape that does not match the floor plan. Each vertex of the octagonal shape of the first cornice fits in between the vertexes of the octagonal floor plan. The face of the cornice has continuous circular arabesque patterns that were created by modelling.

The first tambour is carved in a hexadecagonal shape but because of the thick wall clay and finishing material, it appears circular. Each part has a trefoil arch carved out and hemmed by modelling (Fig. 361). The second cornice is circular in shape with two projecting steps. The face of the lower step has continuous circular arabesque patterns created by modelling, while the upper step has a continuous swirl pattern also made by modelling. There is a second tambour between the second cornice and the ceiling. This tambour features continuous trapezoidal arches carved out of the rock. There are mortises at a regular distance on the arches, from which it is believed statues were installed; presumably the cornice was used as a base for these statues.

The ceiling is cross-vaulted with a small dome, which has an octagonal base and is carved out at the cross point (Fig. 360). The four quarters, which are the result of the division by the cross-vault, also have small domes carved out in them. There are circular decorations created by modelling inside the vaults. The axis of the ceiling's vaults does not overlap with the axis of the floor plan, instead rotating five degrees to the east.

Near the entrance of the cave, inside and outside, are the remains of grooves which suggest the existence of a doorframe. In particular, there are four holes that presumably held rectangular timbers on the outside and on the upper part of the entrance. There might also have been a wooden construction, such as an eave (Fig. 362). In the cave's forecourt, the frieze above the entrance shows the ends of rafters and a beam with continuous trefoil arches in between them (Fig. 363). The rafter ends are intact, and they were probably conserved by ASI.

Present condition: There are remains of wall paintings and decorations inside the cave. By comparing these to the original existing portion of the cave, which is observable through traces of the ASI conservation, it can be seen that the actual wall paintings and three-dimensional designs have deteriorated. A crack, with a maximum width of 5 mm, exists on the cave's east–west wall. Moreover, there is a crack that comes from the ceiling on the eastern side. In the forecourt, a vertical crack is visible on the upper part of the entrance to the east passage.

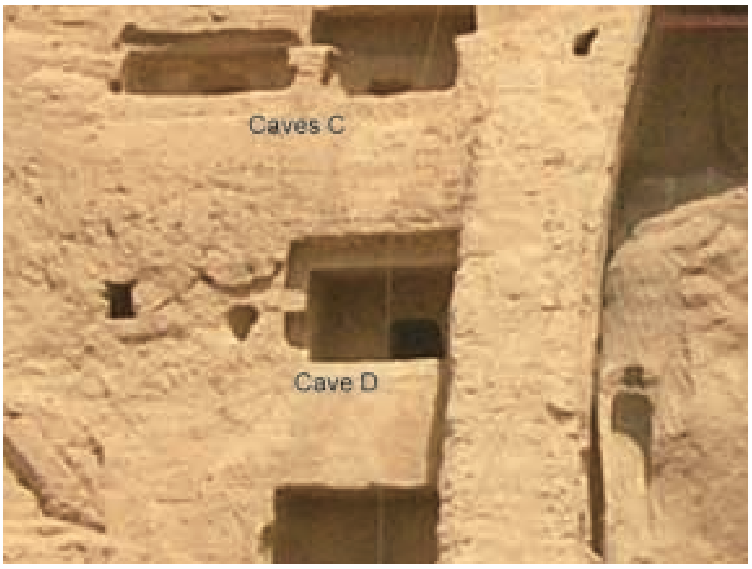


Figure 354 Cave D: general view.

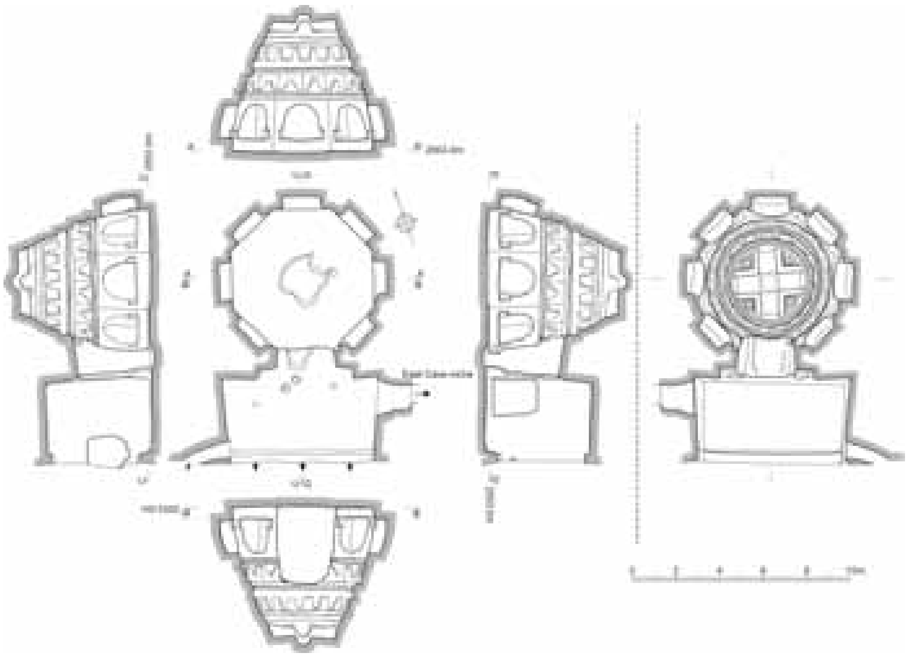


Figure 355 Cave D: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

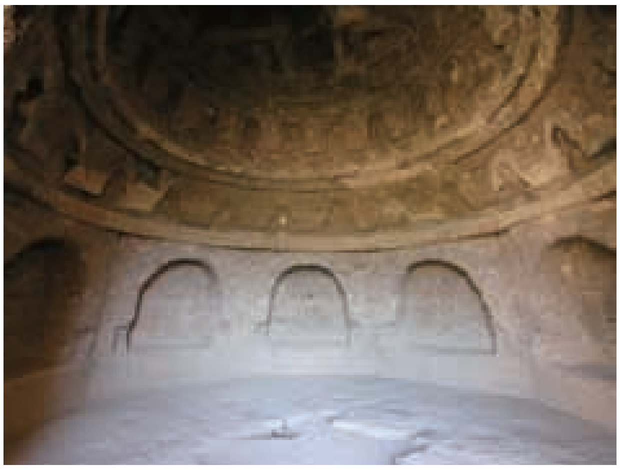


Figure 356 Cave D: northern side.

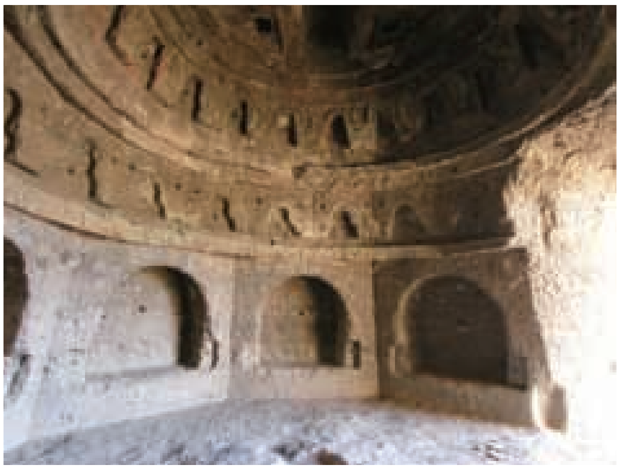


Figure 358 Cave D: eastern side.

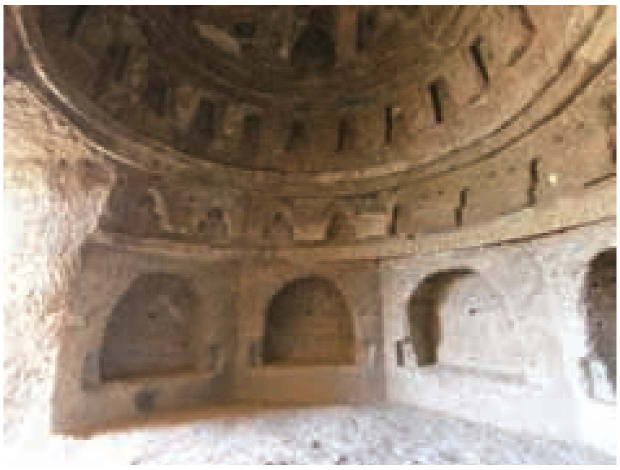


Figure 357 Cave D: western side.

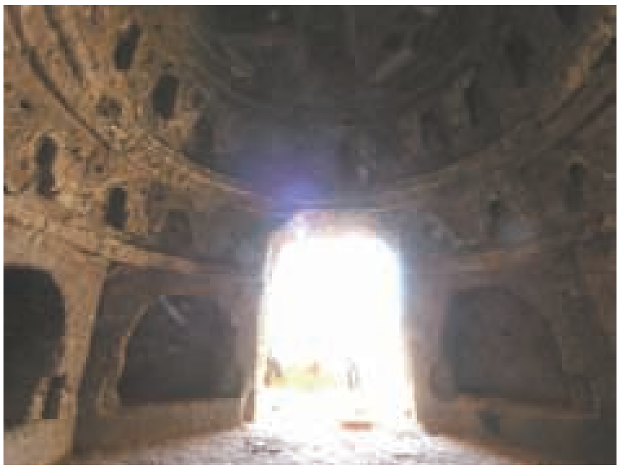


Figure 359 Cave D: southern side.

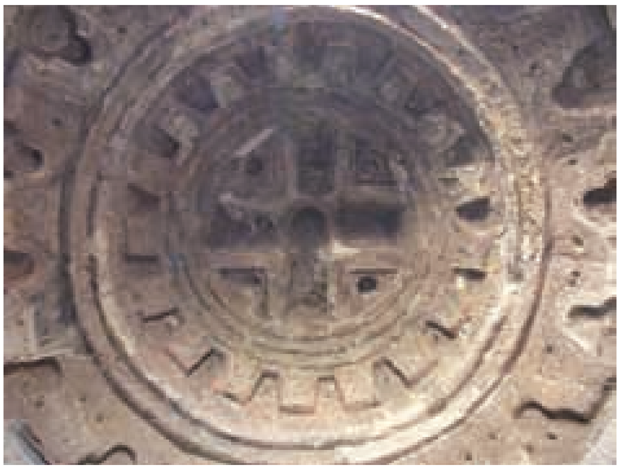


Figure 360 Cave D: ceiling.

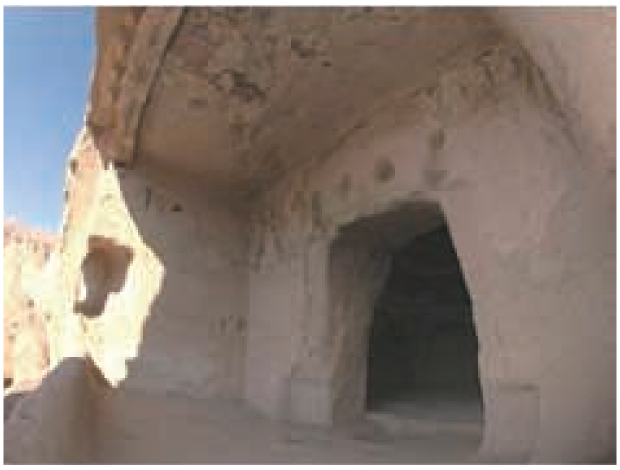


Figure 362 Cave D: entrance.

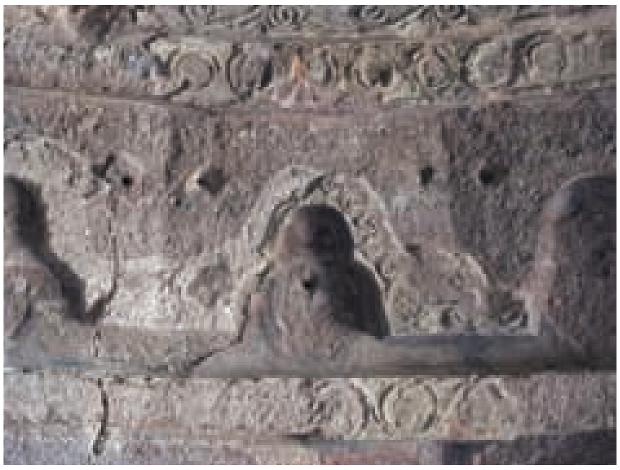


Figure 361 Cave D: the three-dimensional design on the tambour.

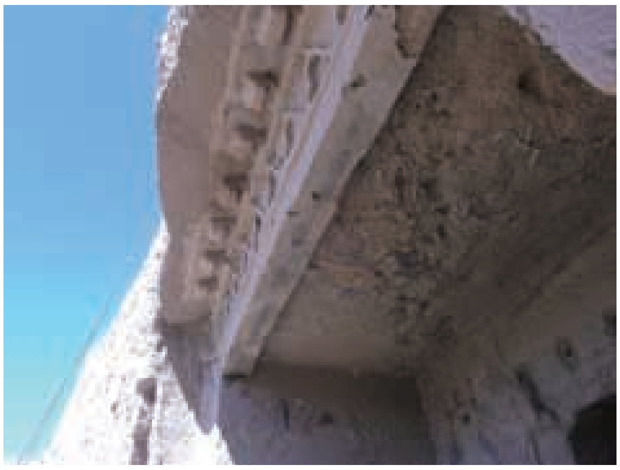


Figure 363 Cave D: the design of the upper part of the forecourt.

Cave D1

Location: Cave D1 is located halfway up the cliff, west of the cave-niche, below Cave D.

Form: Circular plan; domed ceiling; tambour; two cornices. The diameter of the circular plan is around 9 m and the dome ceiling is carved out. The cave features rich three-dimensional decorations. There is a forecourt at the southern side of the cave with a passage that allows access to this cave from the East cave-niches on the eastern side.

Technique and design: There are niches of varying sizes on the side wall, the tambour and the base of the dome. Eight niches are carved out of the side wall. Between these niches are narrower niches longer than they are wide, with squinches on top. Because of this, the plan forms a complicated uneven shape. The squinch in this cave was used not only for structural reasons but also as a design element. Each niche in the side wall has a pedestal, which is carved out, and a height of approximately 50 cm (Fig. 371). Two niches, situated on either side of the entrance, are different from the others in that their arches are wider than their lower width. The first cornice is quite wide and exists above the niches of the side wall and the squinches (Fig. 372). There are niches on the tambour, which is on top of the first cornice, and their depths correspond to that of the squinches.

Compared to the first cornice, the second cornice is deeper and as such, it is possible that it was used as a base for statues, which were located in the arches at the bottom of the dome. Some of the niches – located at the bottom of the dome, carved out of the rock as arches– still have finishes that are hemmed with three-dimensional trapezoid shapes. There is a possibility that arch and trapezoid shapes alternated here, but there is not enough evidence to confirm this suggestion. Different-sized mortises are aligned regularly in the niches of the side wall, tambour and base of the dome. Squinches on the side wall also have mortises, and they presumably held some kind of object. Moreover, it is thought that the cave was covered with paintings because some portions feature remains of a base layer of coating. It is believed that the cave had a centre-focused, solemn interior space with rich decorative elements, which are the combination of paintings on the wall and statues in the niches. There are shallow grooves for a doorframe near the entrance.

Present condition: On the eastern side, a crack runs from the tambour to the middle of the floor; its widest part is around 7 mm. Small vertical cracks are noticeable on the wall near the entrance, and above the middle of the entrance is a crack that runs at right angles to the cliff. It is assumed that these cracks are structural, caused by the redistribution of the load from the weight of the cliff when the passages were carved out. Moreover, in the forecourt, cracks run parallel to the rock on the ceiling, and there are also several vertical cracks on the wall.

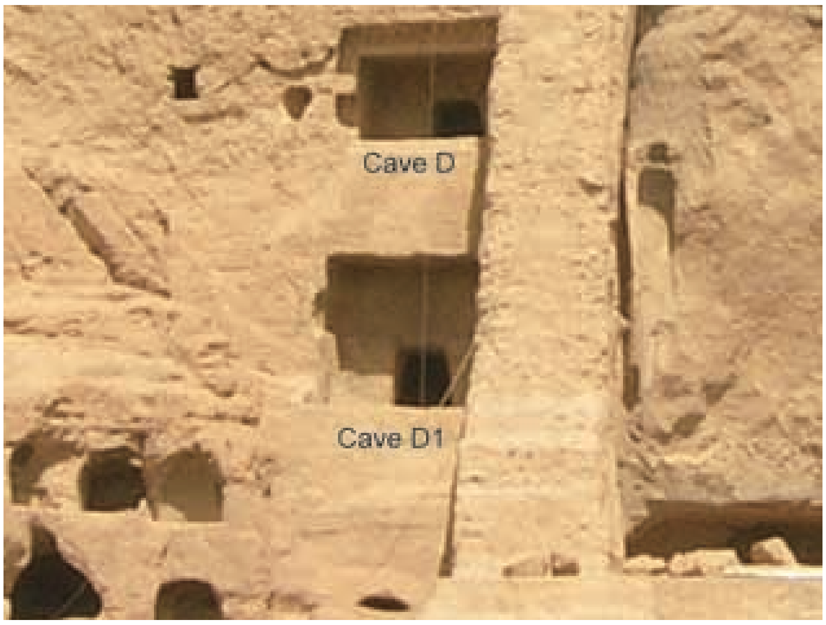


Figure 364 Cave D1: general view.

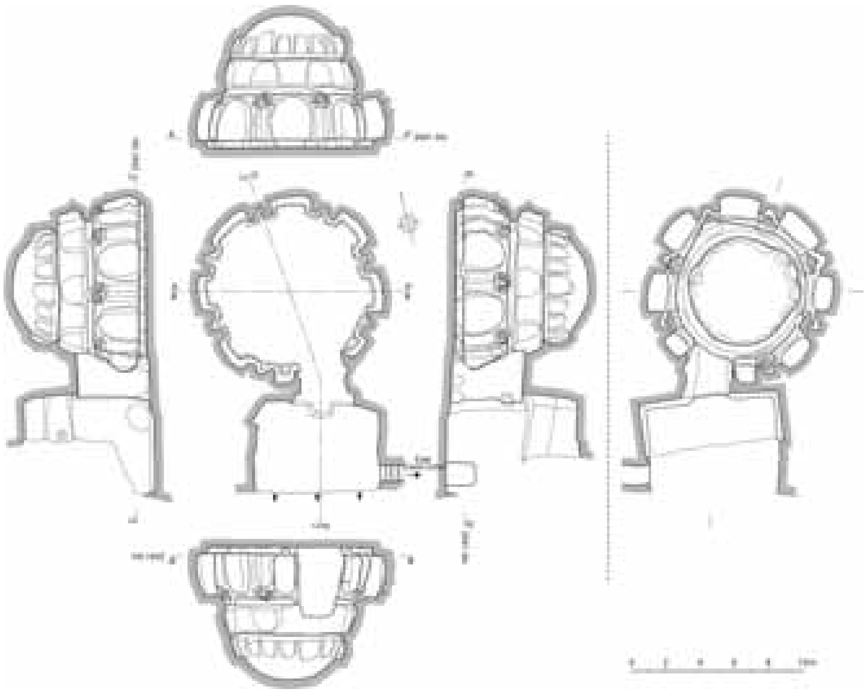


Figure 365 Cave D1: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

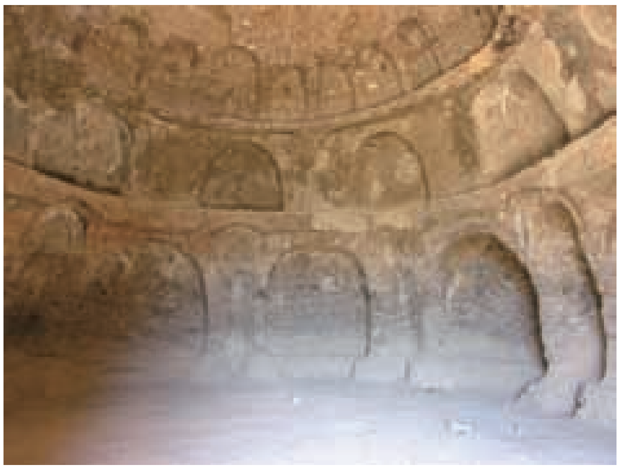


Figure 366 Cave D1: northern side.

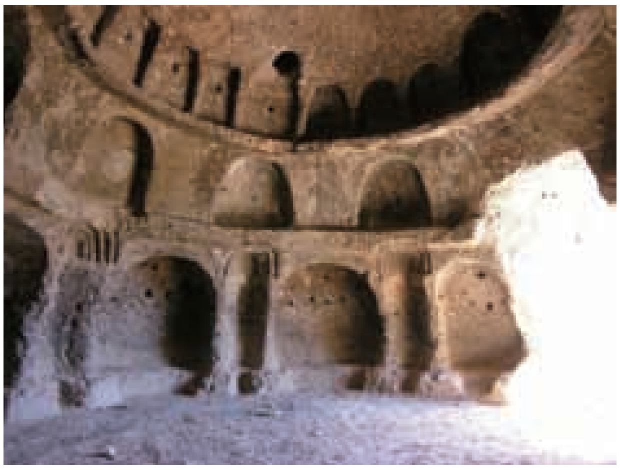


Figure 368 Cave D1: eastern side.

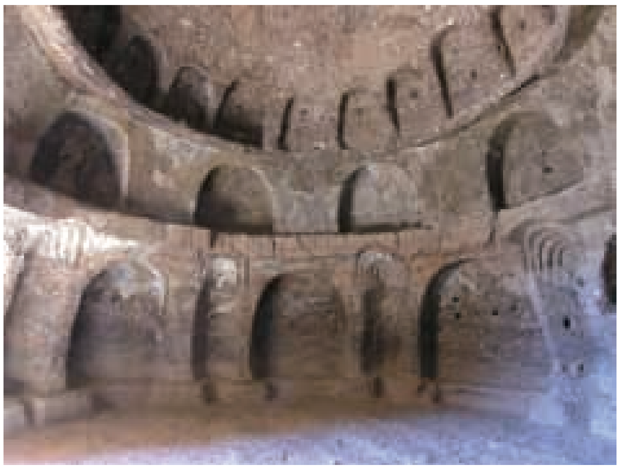


Figure 367 Cave D1: western side.

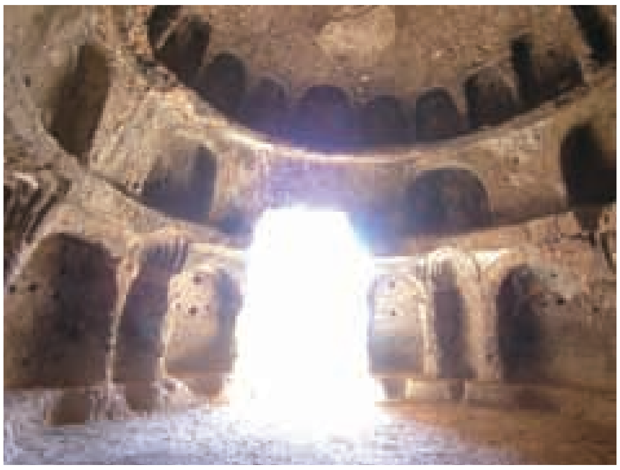


Figure 369 Cave D1: southern side.

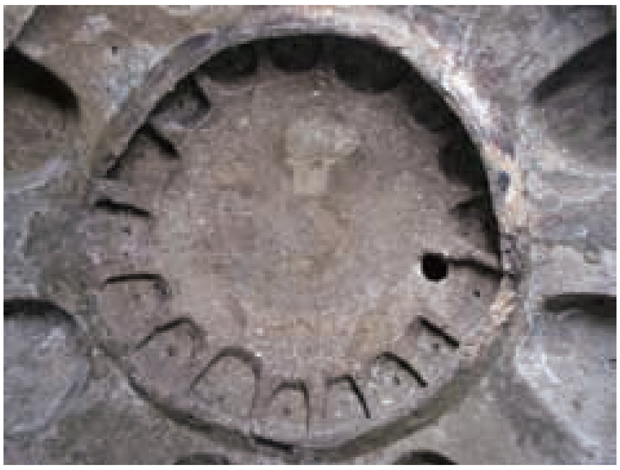


Figure 370 Cave D1: ceiling.

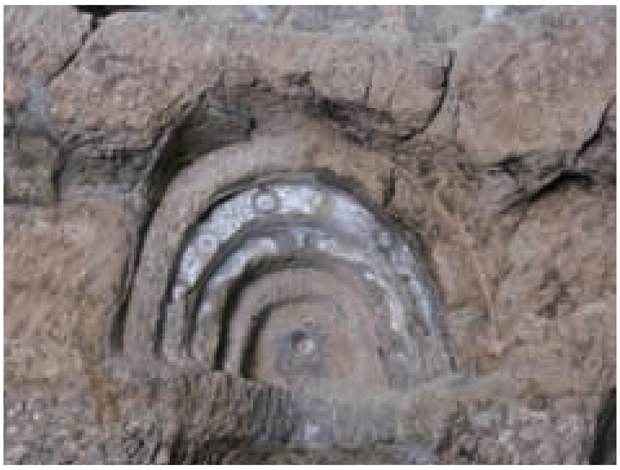


Figure 372 Cave D1: squinch.

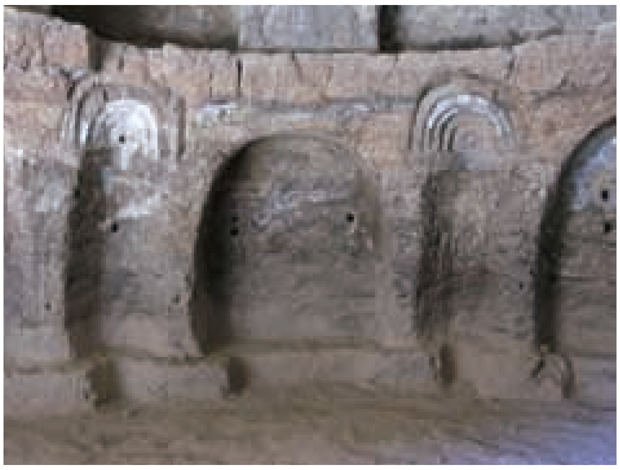


Figure 371 Cave D1: niches on the side wall.

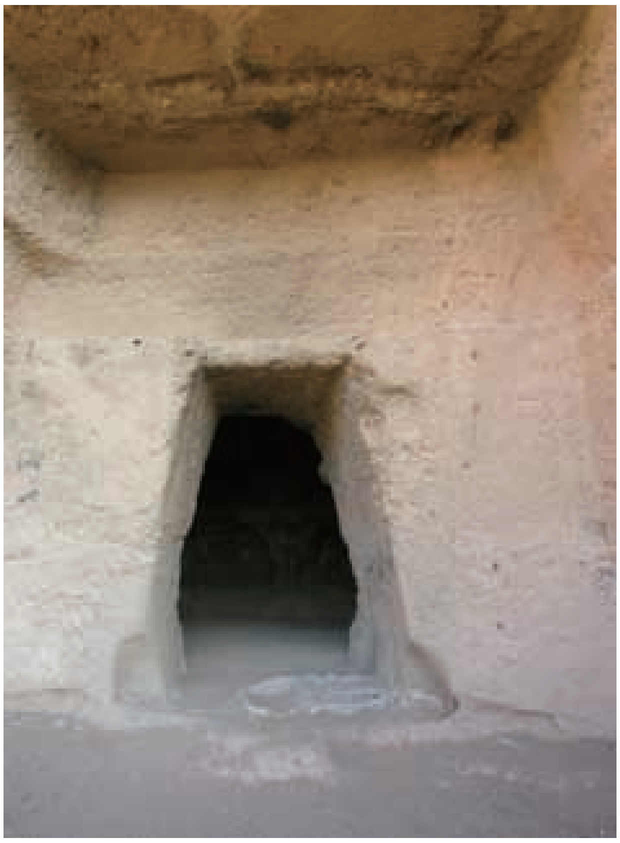


Figure 373 Cave D1: entrance.

Caves S

Location: Caves S are located at the base of the western side of the cliff. There are two rows. The upper row consists of seven caves, Cave S(a)–S(g). Except for Cave S(c) they all have small centred plans. The lower row has six caves, Cave S(h)–S(m). In this row, only Cave S(h) and Cave S(i) have a centred plan.

Form: Caves S(a)–S(g), the upper row, have relatively small square, octagonal or circular plans, with widths of around 2.5–3.5 m. The forms of their ceilings are either *laternen-decke* or domed. On the lower row, Cave S(h), which is the westernmost cave in this row, features an octagonal plan and domed ceiling. Cave S(i) has a square plan and a domed ceiling with squinches. Cave S(j), which is located behind Cave S(i), has a rectangular plan and a vaulted ceiling. Cave S(l) has a relatively wide space with a width of 5 m, however it looks unfinished.

Technique and design: Caves S are relatively small and have simple designs, but they have a variety of types. The ceiling of Cave S(f) has two layers of beams: the first layer of beams forms a square shape, while the second forms an octagonal shape. A dome is carved out in the middle and there are no mortises on the walls. Caves S(b), S(e) and S(h) have octagonal plans and domed ceilings. Each one has a tambour that is divided by cornices. The niche, located across from the entrance on the north side of Cave S(j), is wide and features a carved-out arched frame.

Present condition: Behind Caves S, there is a huge crack in the solid rock, which makes this portion look as though it is separated from the entire Bamiyan solid rock. The crack, which is behind Caves S, reaches the lower row of Caves S, so that Caves S(i) and S(j), as well as Cave S(f), are completely separated from each other and from the north rock wall. Moreover, the south solid rock wall, which contains Caves S, is also deteriorating. Because of this, most of the caves are half-collapsed or completely collapsed; it is impossible to identify their passages, access points and original composition.

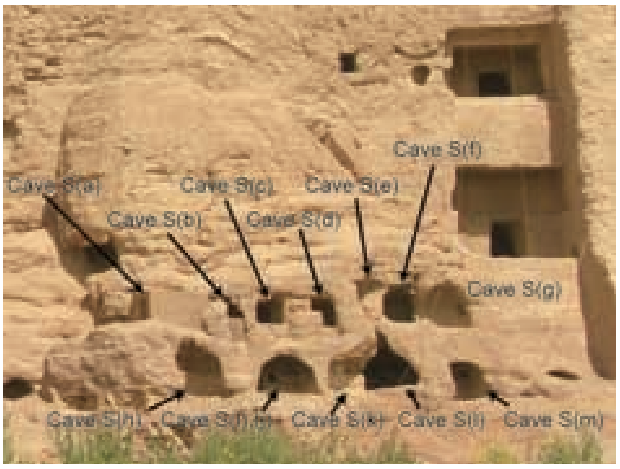


Figure 374 Caves S: general view.

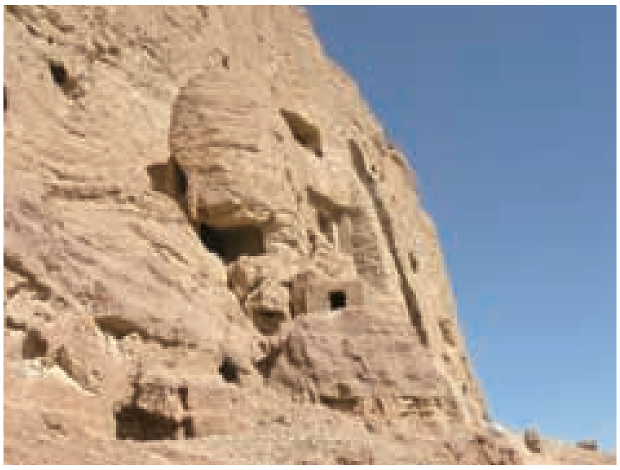


Figure 375 Caves S: view from the western side.

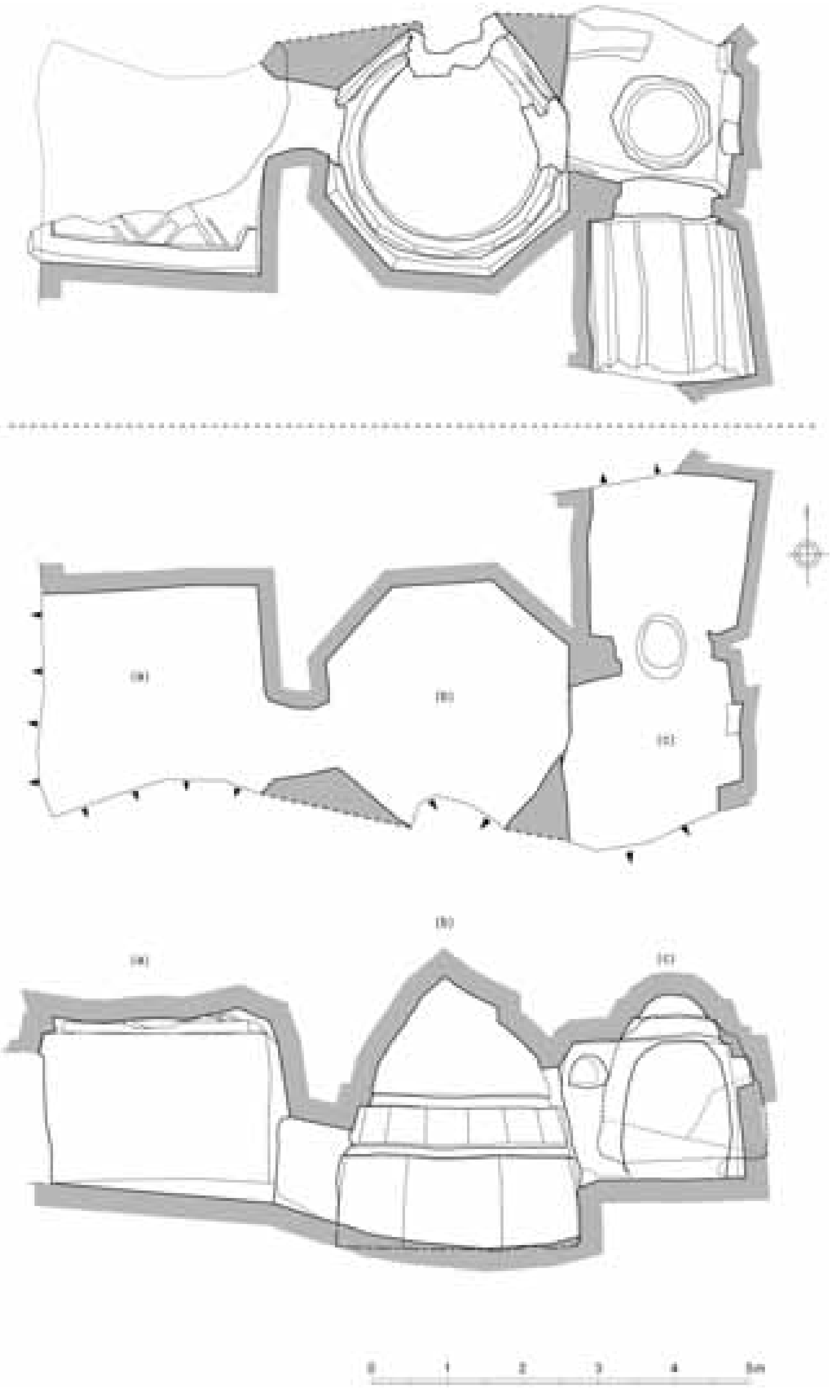


Figure 376 Cave S(a), Cave S(b), Cave S(c): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

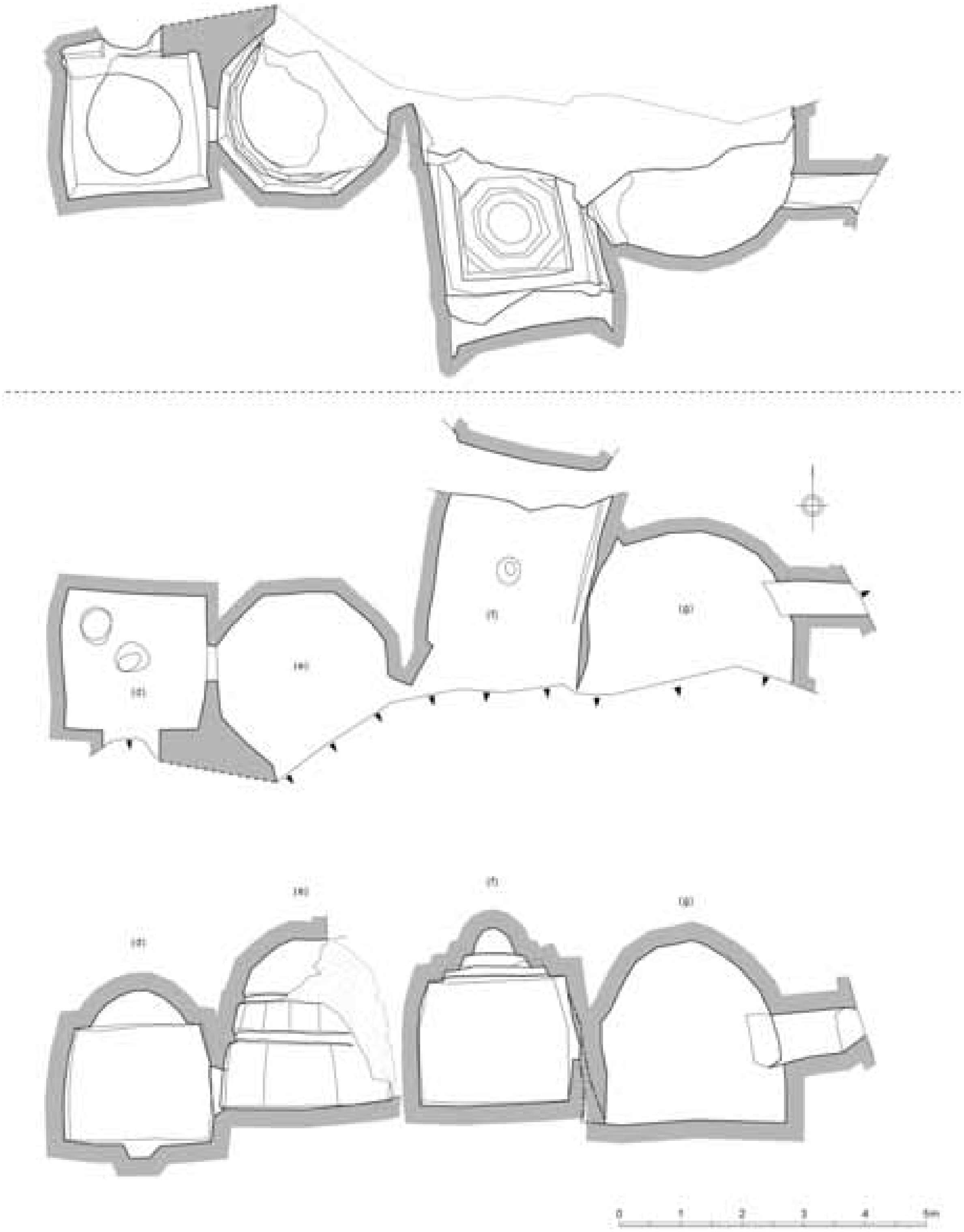


Figure 377 Cave S(d), Cave S(e), Cave S(f), Cave S(g): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

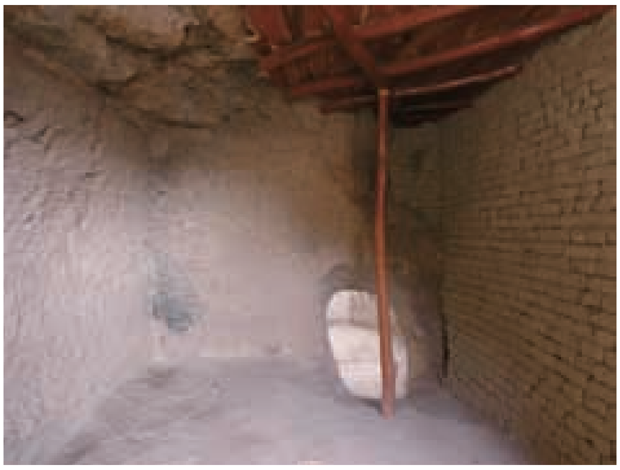


Figure 378 Cave S(a): eastern side.

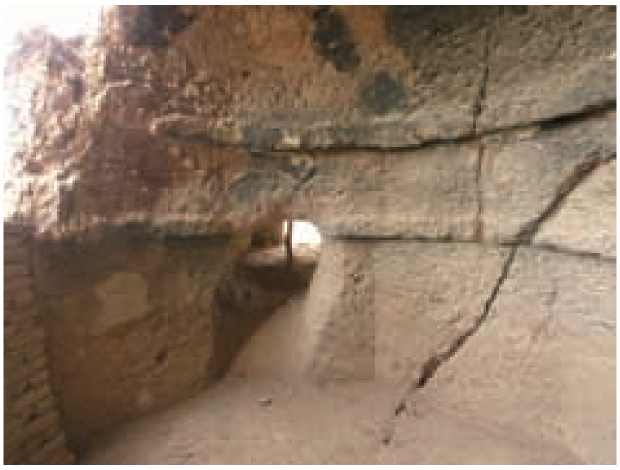


Figure 379 Cave S(b): western side.

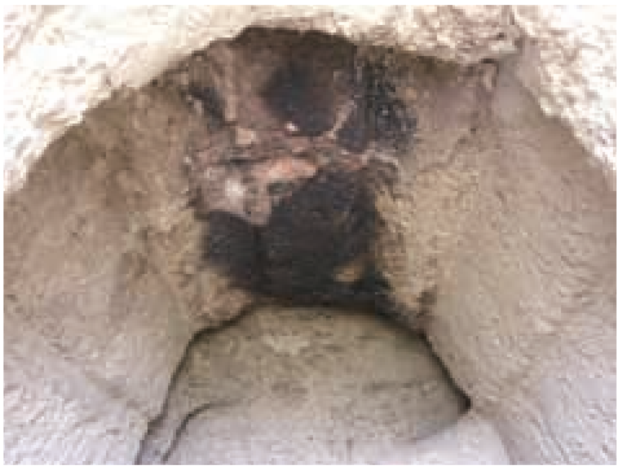


Figure 380 Cave S(c): ceiling.

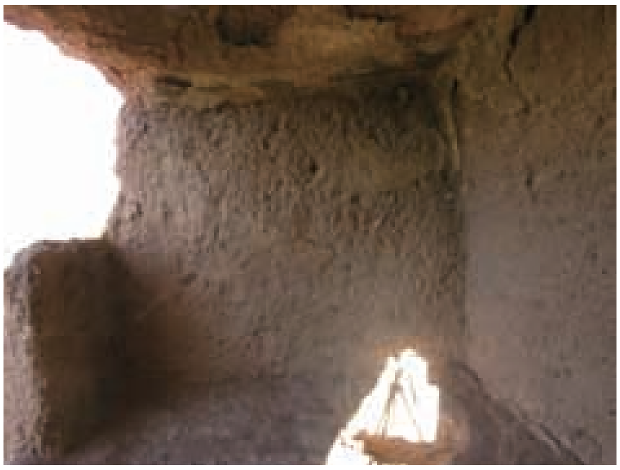


Figure 381 Cave S(d): western side.

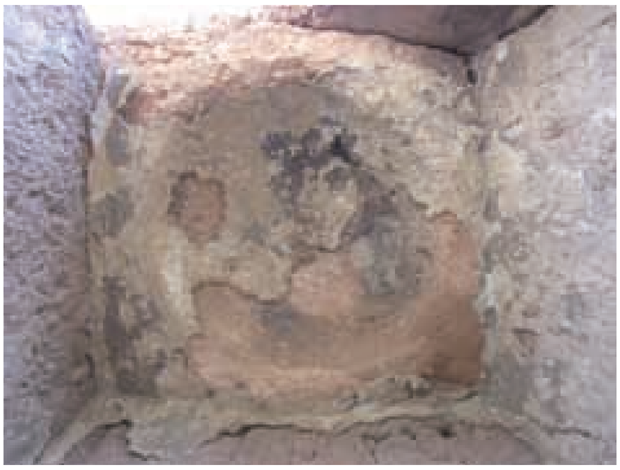


Figure 382 Cave S(c): ceiling.

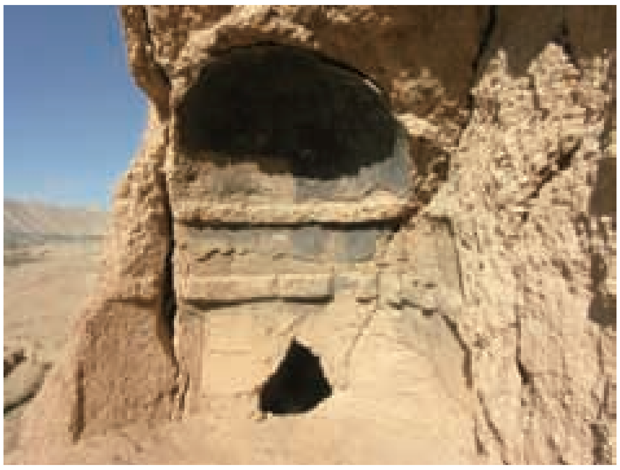


Figure 383 Cave S(e): western side.

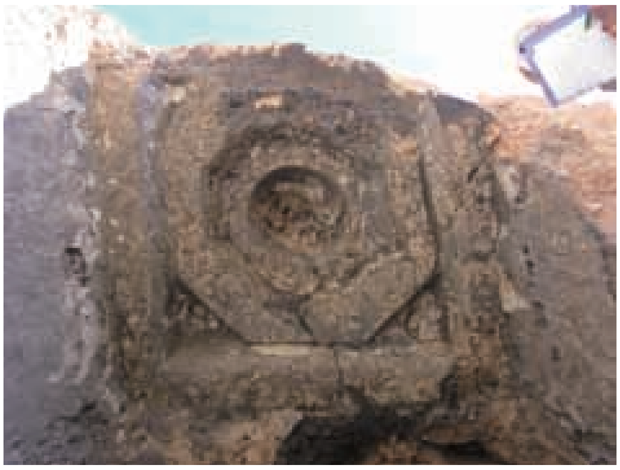


Figure 384 Cave S(f): ceiling.

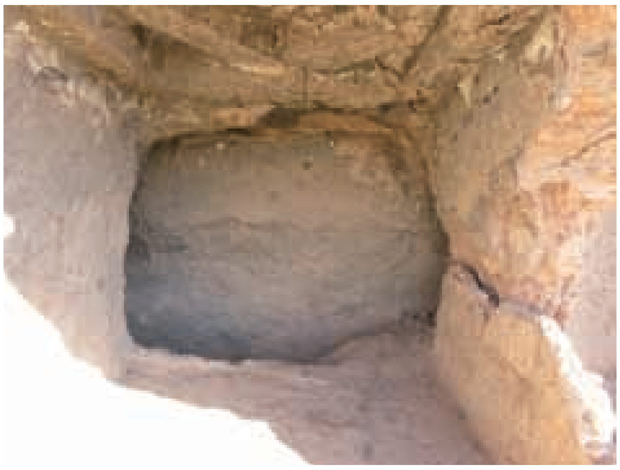


Figure 385 Cave S(f): north side.

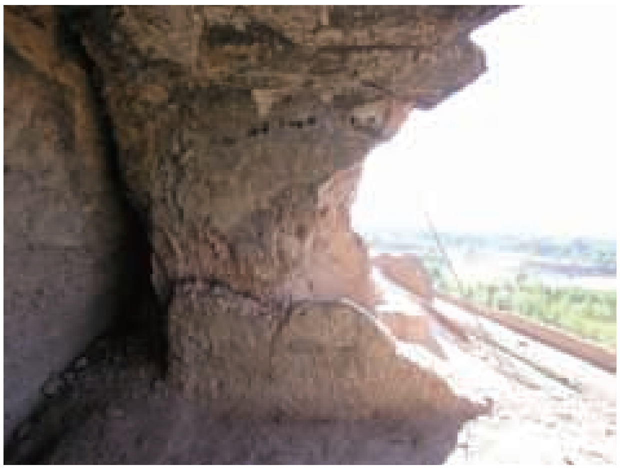


Figure 386 Cave S(f): eastern side.

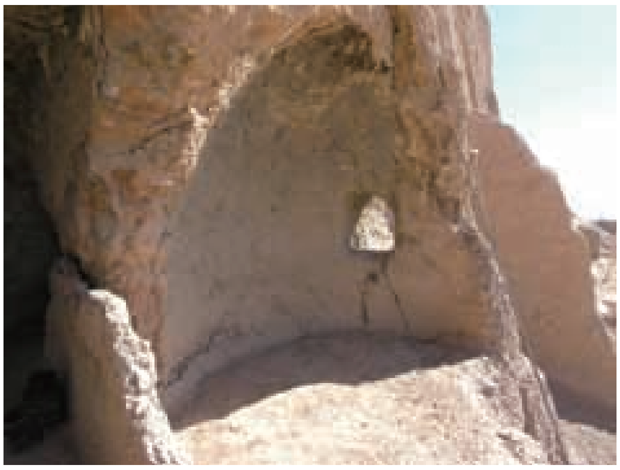


Figure 387 Cave S(g): eastern side.

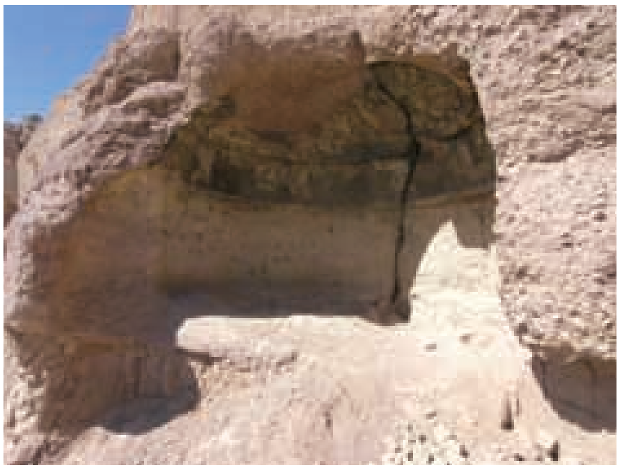


Figure 388 Cave S(h): western side.

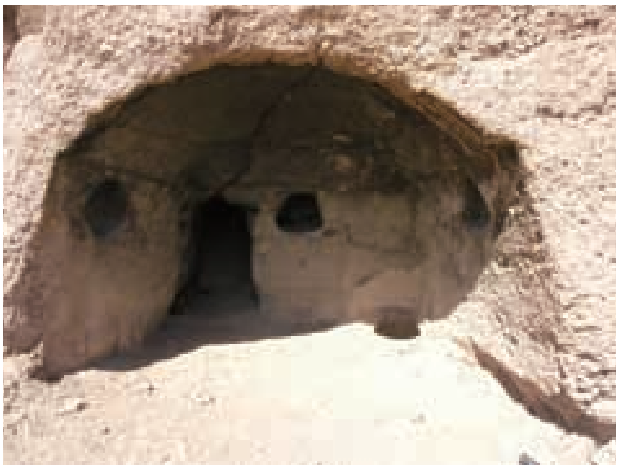


Figure 389 Cave S(i): northern side.

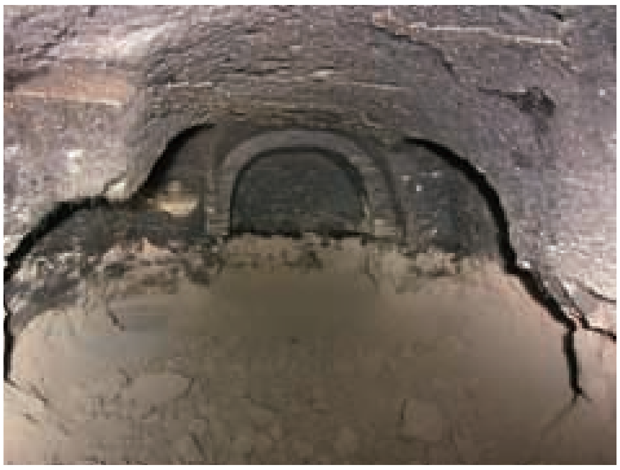


Figure 390 Cave S(j): northern side.

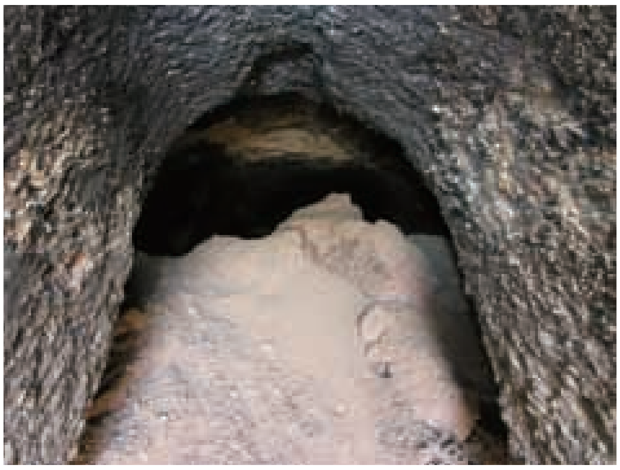


Figure 391 Cave S(j): entrance with earth and sand.

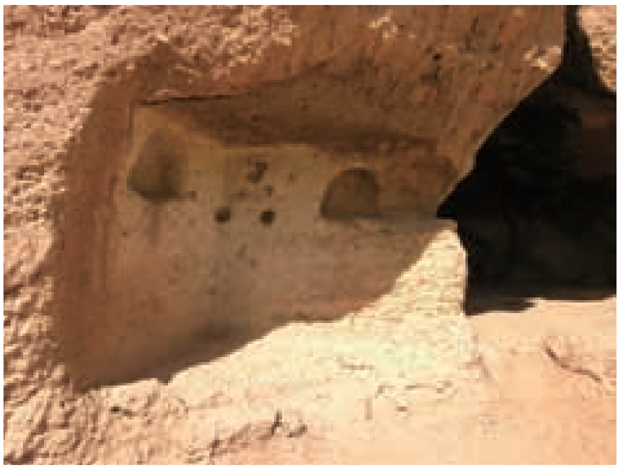


Figure 392 Cave S(k): northern side.

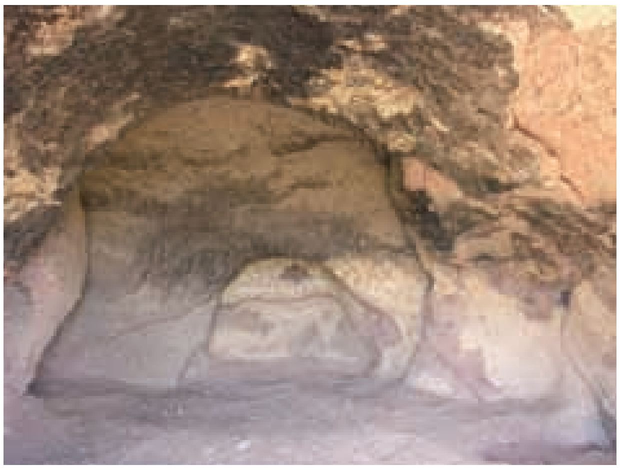


Figure 393 Cave S(l): northern side.

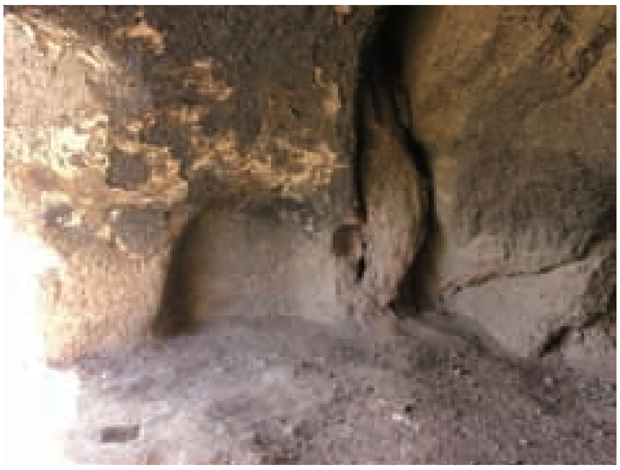


Figure 394 Cave S(l): western side.

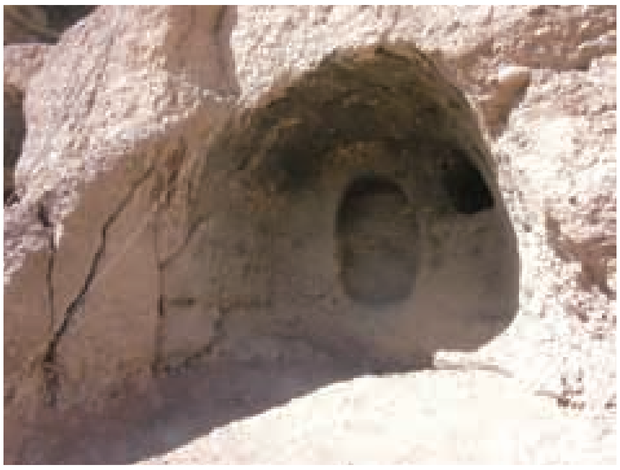


Figure 395 Cave S(m): northern side.

Caves E

Location: Caves E are situated halfway up the cliff, west of Caves S. There are 15 caves in a row, from the westernmost Cave E(a) to the easternmost Cave E(o).

Form: East of Cave E(a), which has a rectangular plan with a longer north–south axis, there is a set of stairs (Fig. 400). The entrances to both Cave E(a) and Cave E(b) are found at the base of these stairs, facing each other. Cave E(b) has a rectangular plan, longer in the east–west direction, and its ceiling has painted remains of grid patterns (Fig. 401). A pedestal is carved out at the eastern side of the cave, with entrances on both sides to allow access to the adjoining Cave E(c), which used to have a sitting Buddha. However, the reason for the existence of these entrances is not clear. If they had been there since the beginning, they might have had some functions related to the sitting Buddha. But since there is no harmony between their shape and location and the pedestal, it is believed that they were constructed later. Cave E(c) is a niche that used to have a sitting Buddha, which was destroyed. There is a pilgrimage route around the destroyed Buddha. Holes, which presumably supported beams, were carved out of the front of the Buddha's base and the side walls of the niche (Fig. 402). There are traces of holes used to fix wooden beams, which supported a cantilevered terrace on the floor of the sitting Buddha (Fig. 403).

There is a step corridor to Cave E(d), which is located next to Cave E(c). Cave E(d) appears to be a front room for Cave E(e). Between Cave E(e) and Cave E(f) there is a narrow adjoining opening, which allows only one person to pass and is presently used as a passage. However, since its floor level is about 1 m higher than that of Cave E(f), it is believed to have been carved out later. Next to Cave E(e) are three aligned caves, E(f), E(g) and E(h), which have rectangular plans. There is a step corridor that descends in front of Cave E(h). It is obvious that both passages, between Cave E(f) and Cave E(e), and the one in front of Cave E(f), were made at a later stage. The passage in front of Cave E(f) is assumed to have been an access to three caves, Caves E(f), E(g) and E(h). Cave E(i), which has a square plan and is next to Cave E(h), is currently used as a passage. As mentioned before, it is thought that the passage from Cave E(h) was made later, and originally Cave E(h) was accessed via Cave E(j).

Caves E(j) to E(o), which are located in the east part of Caves E, have rectangular plans. There are stairs leading up to Caves P, Caves Q and Caves R at the upper western side of the forecourt of Cave E(m) (Fig. 406). Unfortunately, since the entrance to the stairs has collapsed, it was impossible to ascend to these caves. However, it is possible that Caves E might have been connected to the upper caves by this step corridor.

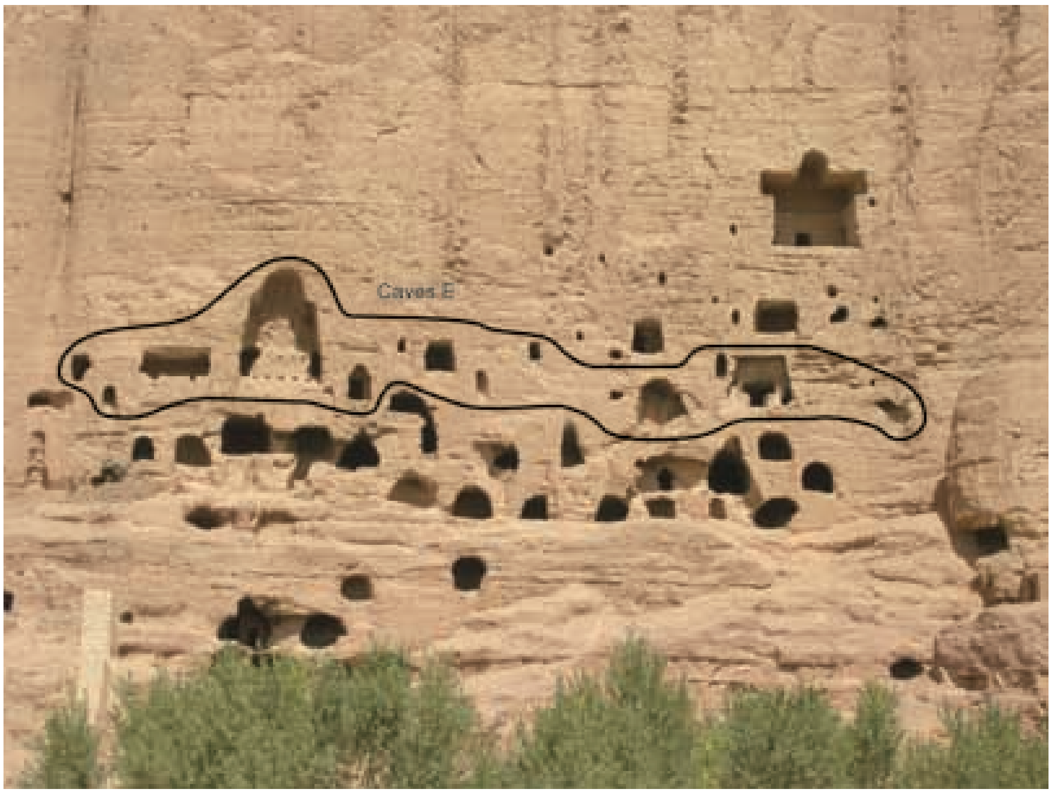


Figure 396 Caves E: general view.

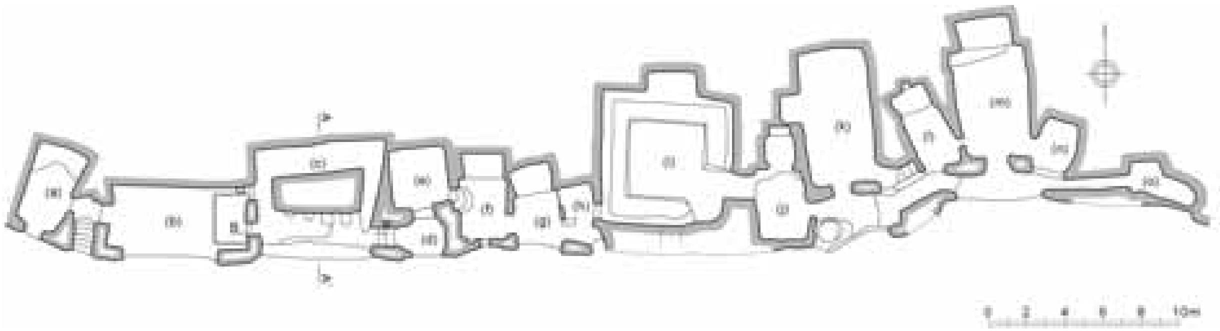


Figure 397 Caves E: plan (after Kodera *et al*. 1971).

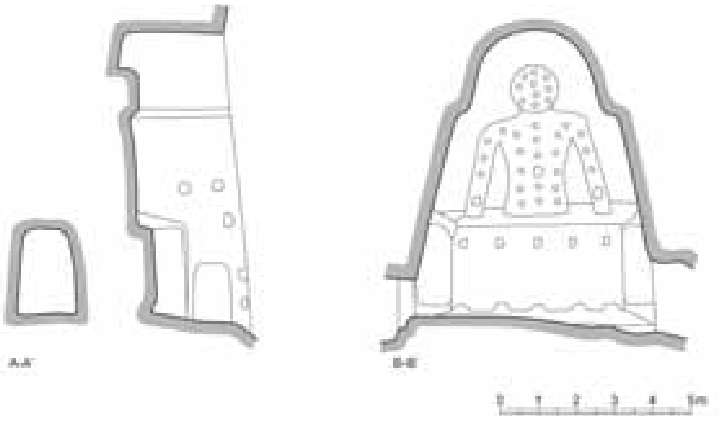


Figure 398 Caves E: section (after Kodera *et al*. 1971).

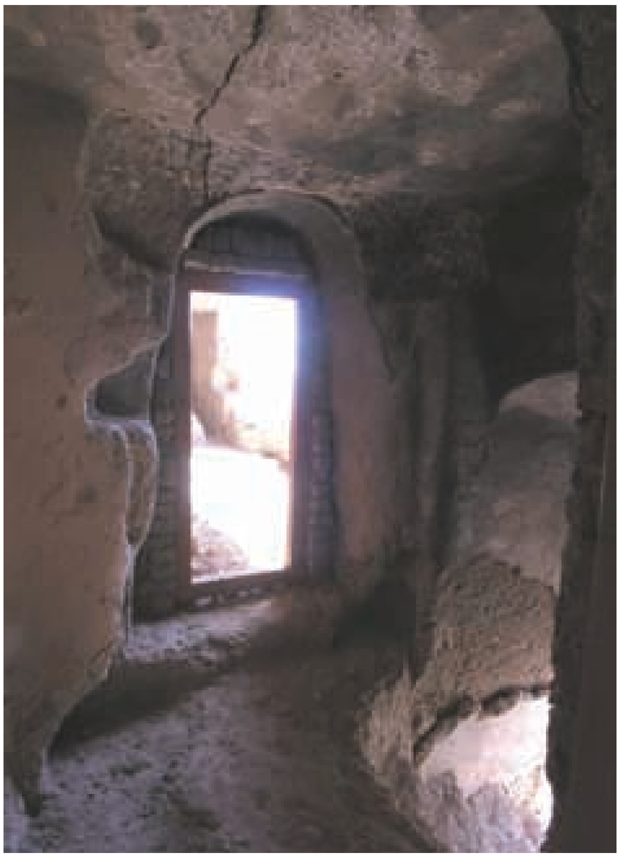


Figure 399 Cave E(b): entrance.

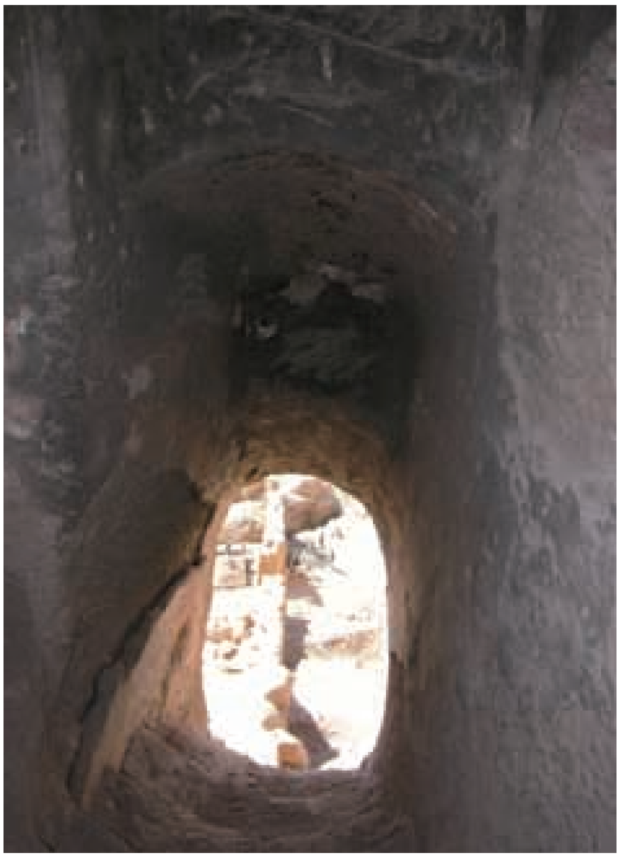


Figure 400 Stairs between Cave E(a) and Cave E(b).

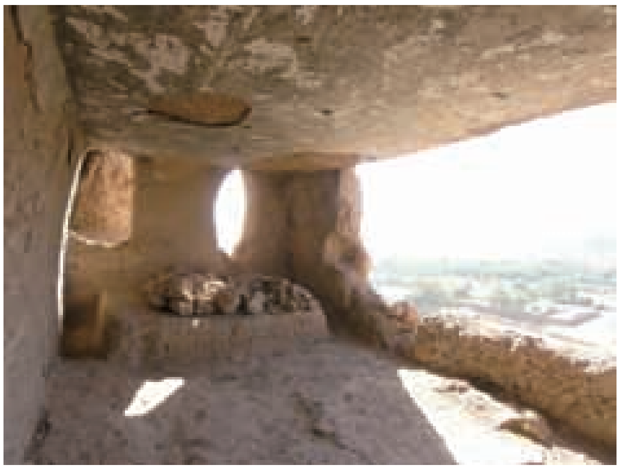


Figure 401 Cave E(b): eastern side.

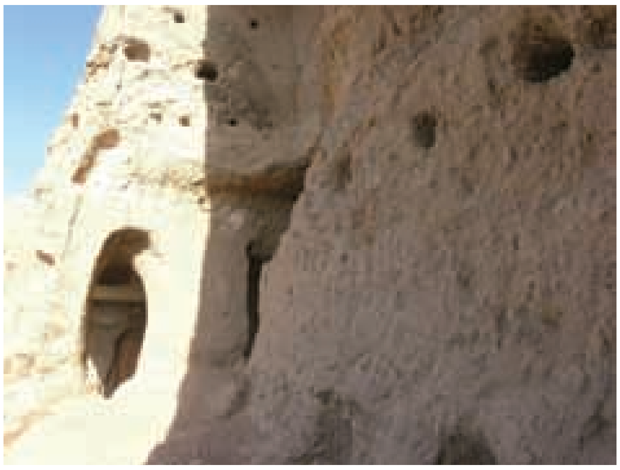


Figure 402 Cave E(c): western side.

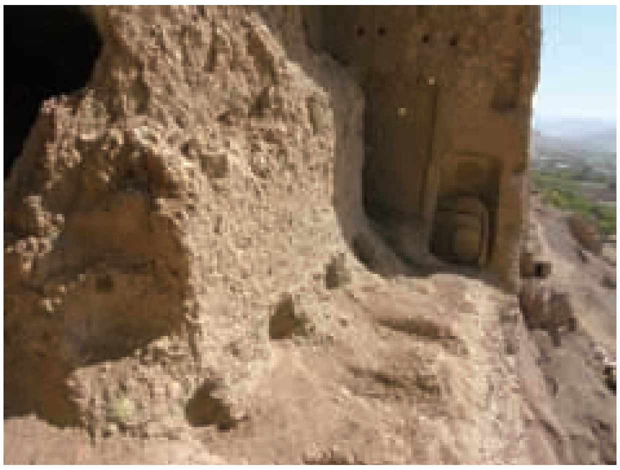


Figure 403 Cave E(c): remains of a wooden construction on the front façade.

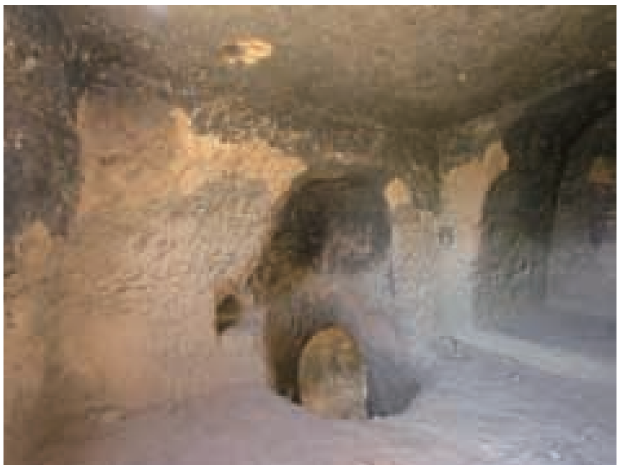


Figure 404 Cave E(f): passage to Cave E(e) at the western side.

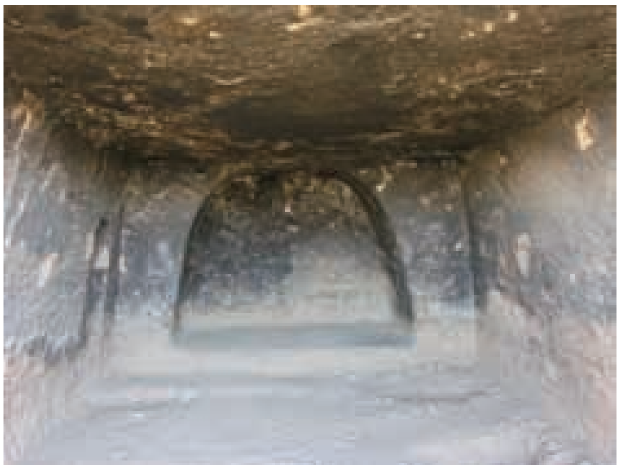


Figure 405 Cave E(m): northern side.

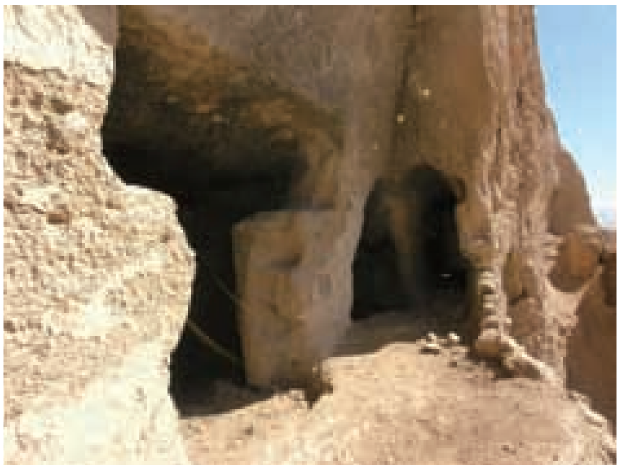


Figure 406 Cave E(m): forecourt.

Cave E(e)

Location: Cave E(e) is located next to Cave E(c), which used to have a sitting Buddha, and is behind Cave E(d).

Form: Square plan; domed ceiling; tambour; squinch. It is a relatively small cave, about 3 m deep. There are four squinches at the corners of the tambour. Below the tambour is a cornice, but there is not one above the tambour. In the corners on top of the cornice there are squinches, whose edges are offset from the wall at the point where the dome starts.

Technique and design: Since there are the remains of wall paintings, it is assumed that the walls were originally decorated in a solemn manner with a variety of colours. Thousands of Buddhas were painted on the ceiling, but most of them are now lost. There are many remains of cut surfaces, which were made when the paintings were scraped off. The process and techniques of wall painting were observed in these areas. According to the observation of the northern wall, there are four layers in the process. The first two are 'rough wall clay layer', the third is 'middle paint', and the top layer is the 'colouring process'. The first two are the 'rough wall clay layers', the first layer after the solid rock, is about 10 mm thick with a mix of clay, sand and Susa.

The second layer is also a 'rough wall clay layer', and the materials are the same. However, the type of clay is different from that used in the first layer, but is the same as that used for the third layer, the 'middle paint', which is explained below. From these facts, it is believed that the first and second layers were added at different times and the first layer is the original layer. The second layer, measured at about 43 mm, has wooden bars that penetrate through the first layer, the 'rough wall clay'. This is designed to hold the two layers together. The third layer, which is assumed to be 'middle paint' and was done at the same time as the second layer, consists of more sand than the 'rough wall clay layer'. Susa is cut to short pieces and dispersed in the layer. The thickness of this layer was measured at 9 mm.

The finishing layer, which is visible now and has several colours, is located on top of the third layer. Several paints were used on top of a white layer, which is assumed to have been a base coating for the colours.

Present condition: An entrance, presumably made later, was carved out of the southeastern corner of the eastern wall, which is believed to have had a squinch (Fig. 411). The visible clay wall has deteriorated due to plunder and human distraction.

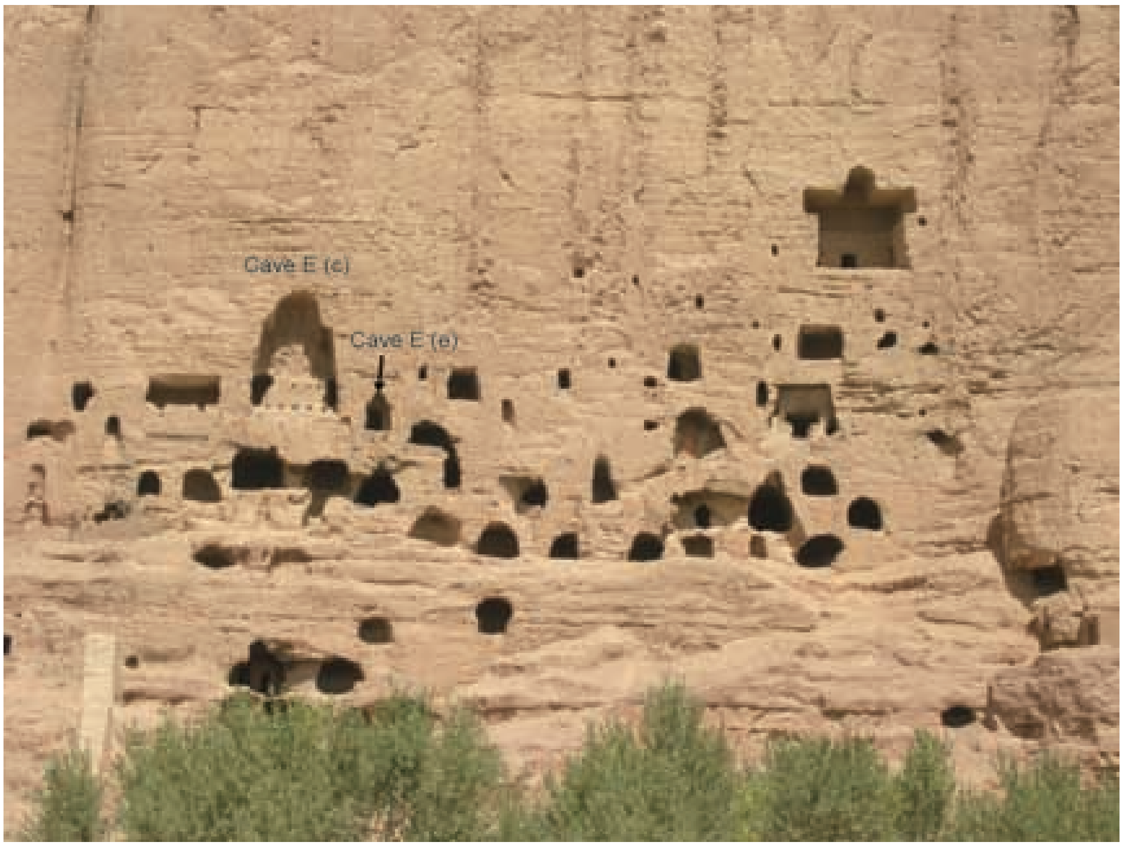


Figure 407 Cave E(e): general view.

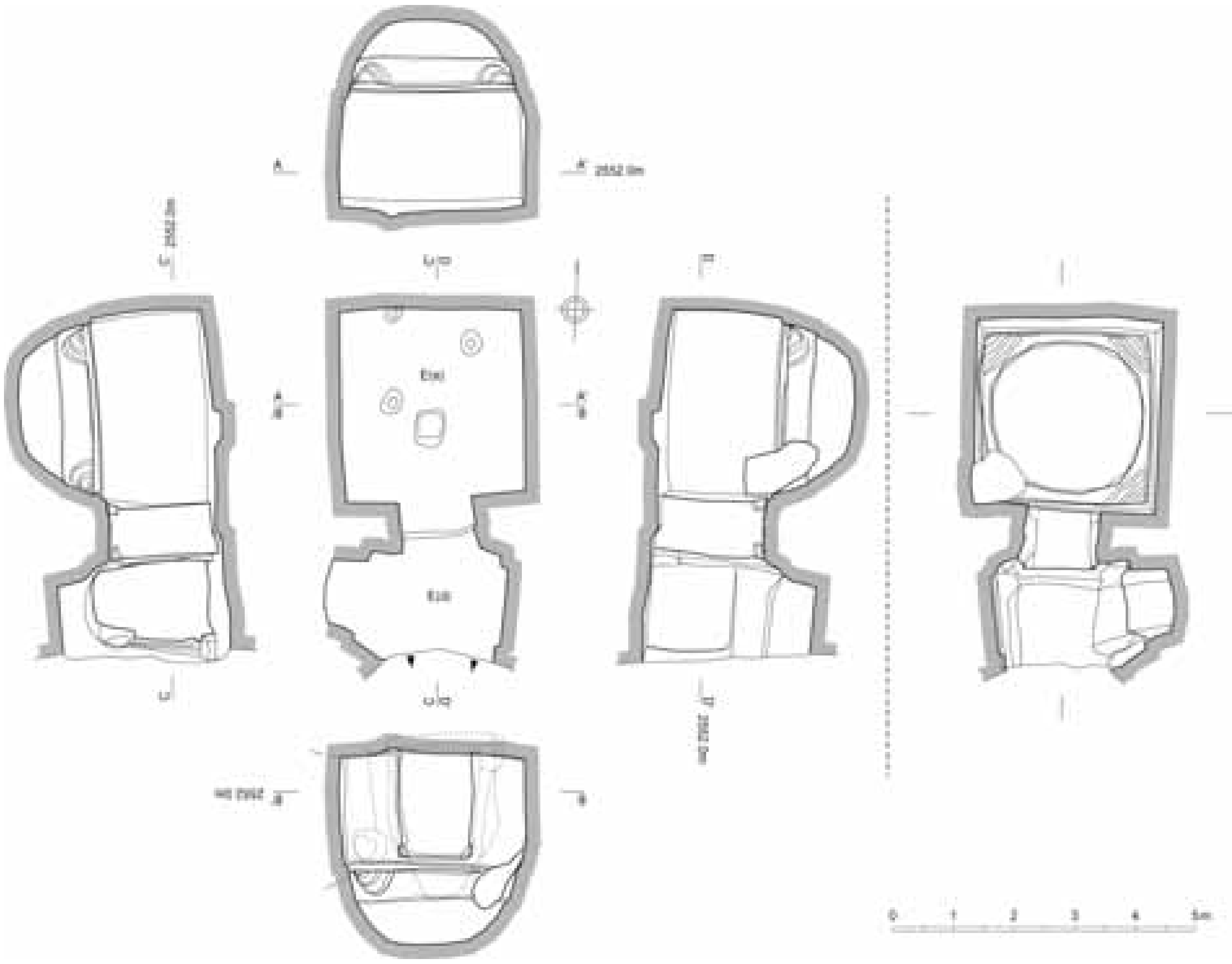


Figure 408 Cave E(e): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

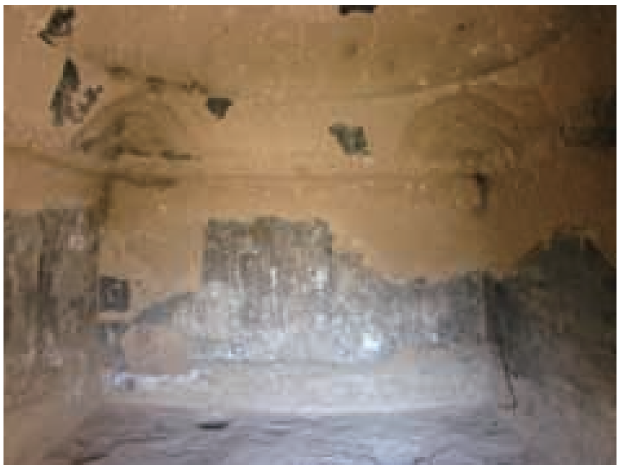


Figure 409 Cave E(e): northern side.

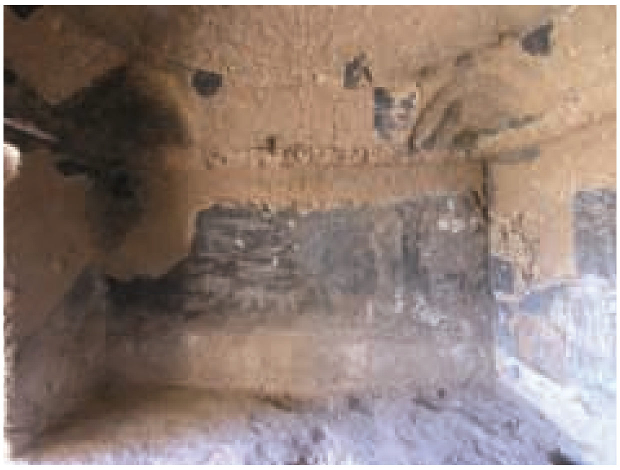


Figure 410 Cave E(e): western side.

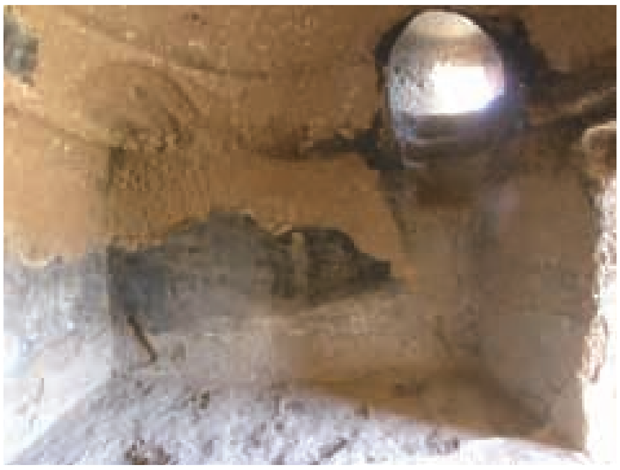


Figure 411 Cave E(e): eastern side.

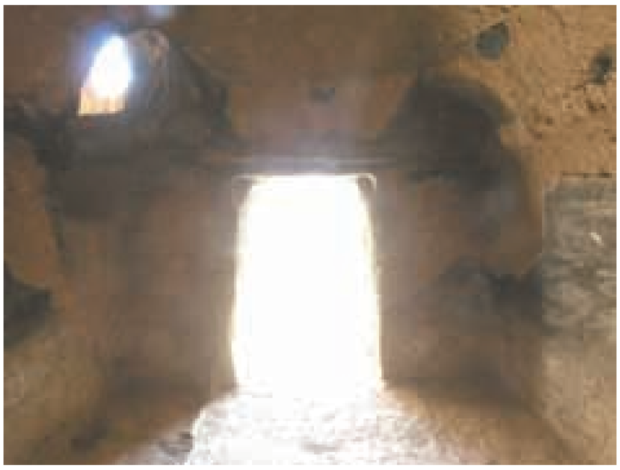


Figure 412 Cave E(e): southern side.

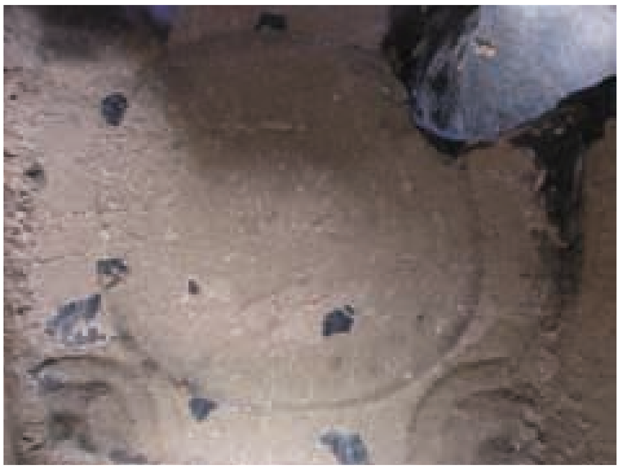


Figure 413 Cave E(e): ceiling.

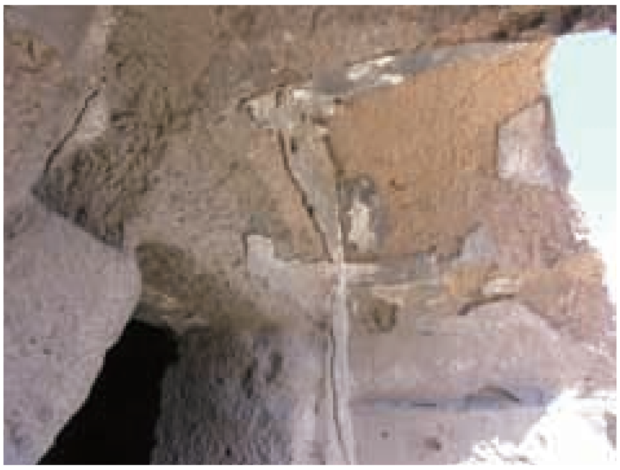


Figure 414 Cave E(e): upper part of the entrance.

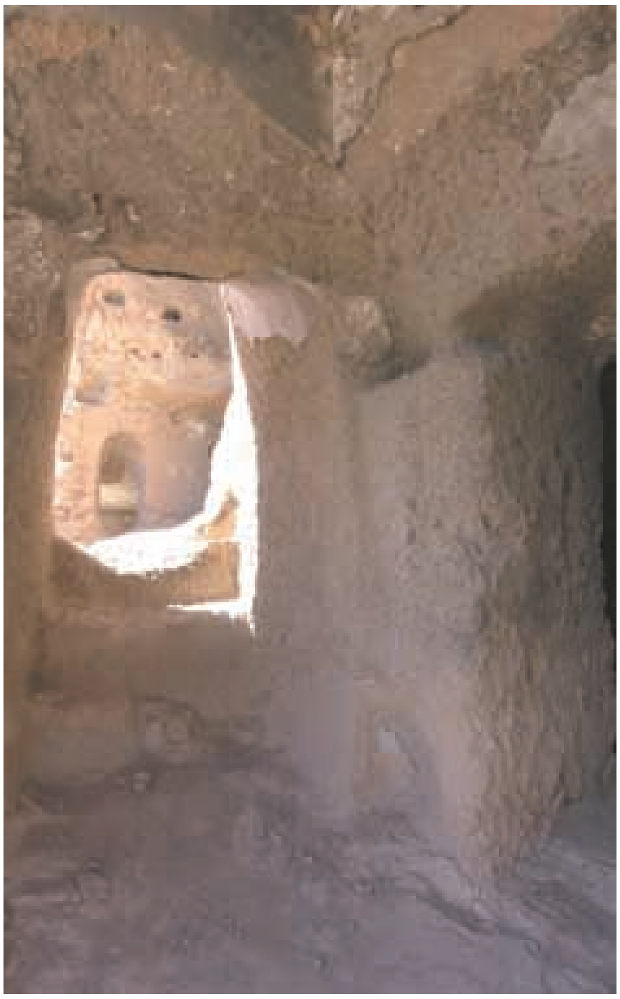


Figure 415 Cave E(e): view of the stairs to Cave E(c) seen from the entrance of Cave E(e).

Cave E(i)

Location: Cave E(i) is located in the middle of Caves E.
Form: A square plan; domed ceiling; tambour. At around 6 m deep, Cave E(i) is the largest cave in Caves E. There is a tambour located between the walls and the dome, slightly offset from the side walls.
Technique and design: There is a large niche in the northern wall. Apart from near the entrance to Cave E(j), there is a bench-like base that runs along the entire wall; the bench is 1.4 m deep, relatively wide for Bamiyan. No mortises were found on the side walls above the bench-like base. There are triangular components, similar to pendentives, at the corners below the tambour. The short tambour is offset from the side walls and the dome, both at its top and bottom. It is a simple tambour without a cornice or squinches.
Present condition: The entire surface of the side walls is sooty. Some wall clay remains on the walls, however most of the clay has peeled off and the remains of chisel marks are visible on the surface of the walls. Currently, there is an entrance that leads to Cave E(h) at the southwest corner (Fig. 419). Since the shape of the entrance is irregular and the bench-like base of this part has been destroyed, it is thought that the entrance is not part of the original design. Only the entrance to Cave E(j), which is located on the eastern side, is assumed to be original (Fig. 422). A serious vertical crack, 30–40 mm wide, exists at the southwest corner and upper part of the entrance to Cave E(h) (Fig. 424). At the same point, there is a crack that runs parallel to the cliff surface. On the floor and upper part of the entrance to Cave E(j), there is yet another crack. Since these cracks are parallel to the cliff, they might have been caused by the structural failure of the solid rock. However, it is noticeable that they are located near the entrances, and there is a tendency for cracks to occur as a result of the redistribution of the load from the weight of the cliff near entrances.

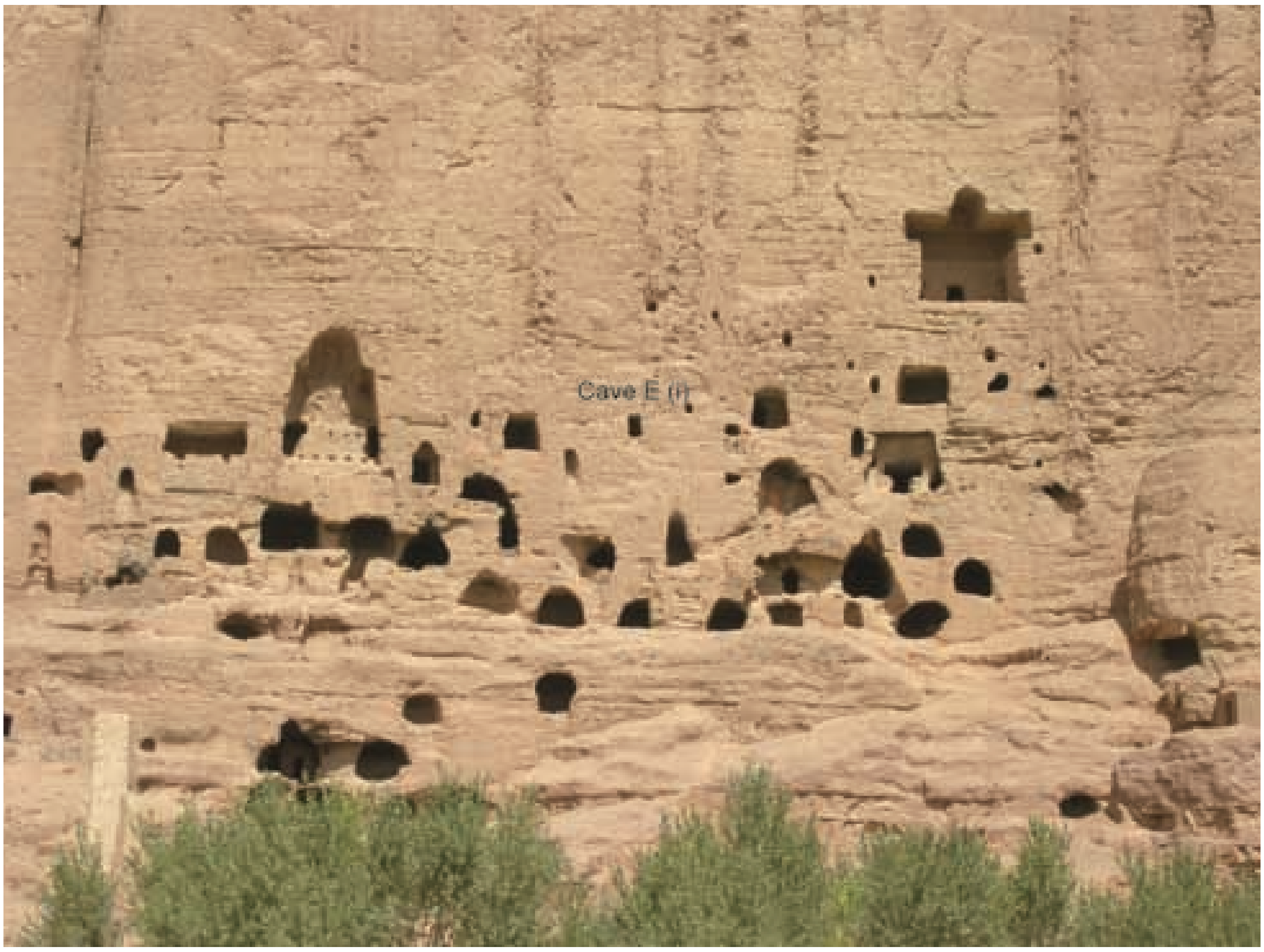


Figure 416 Cave E(i): general view.

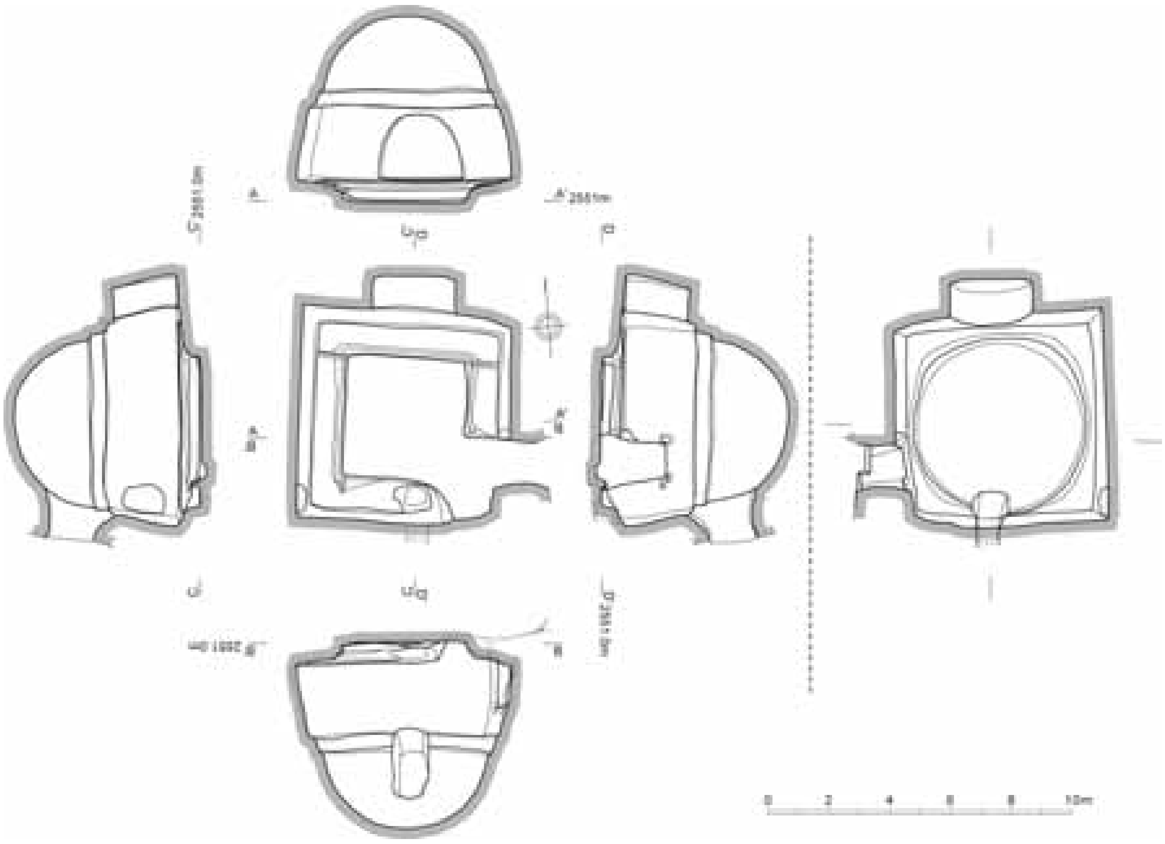


Figure 417 Cave E(i): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

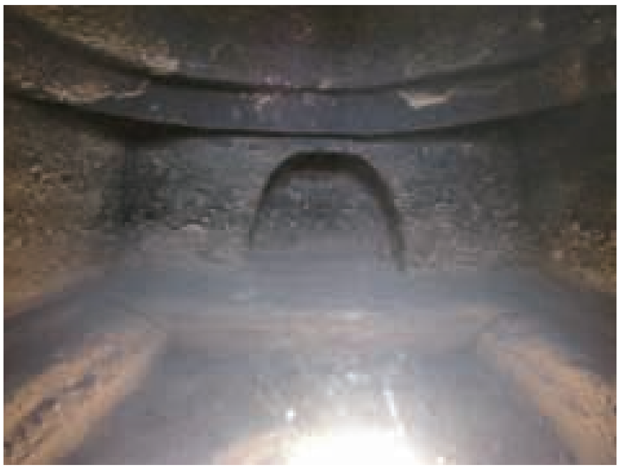


Figure 418 Cave E(i): northern side.

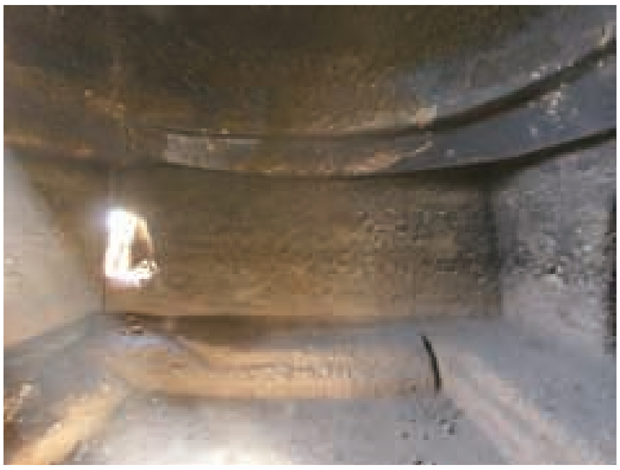


Figure 419 Cave E(i): western side.

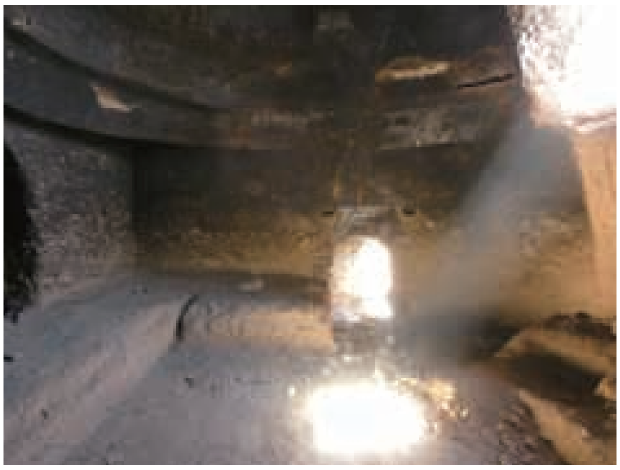


Figure 420 Cave E(i): eastern side.

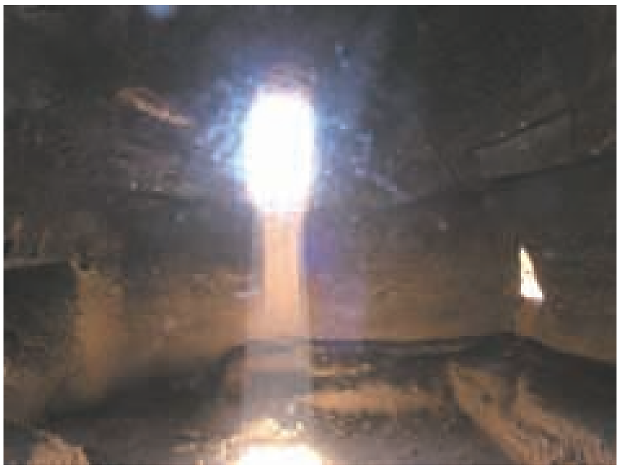


Figure 421 Cave E(i): southern side.

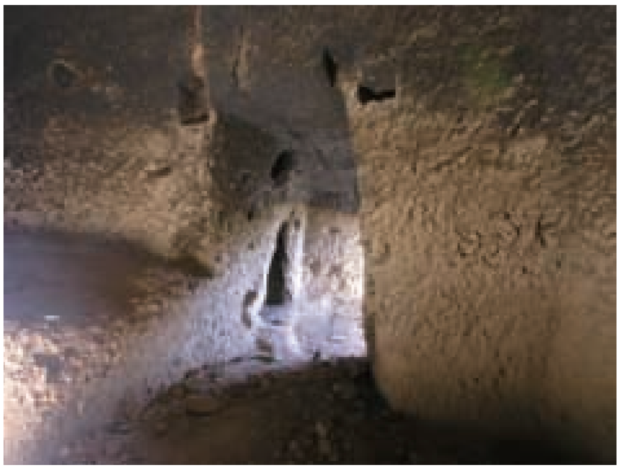


Figure 422 Cave E(i): entrance to cave E(j).

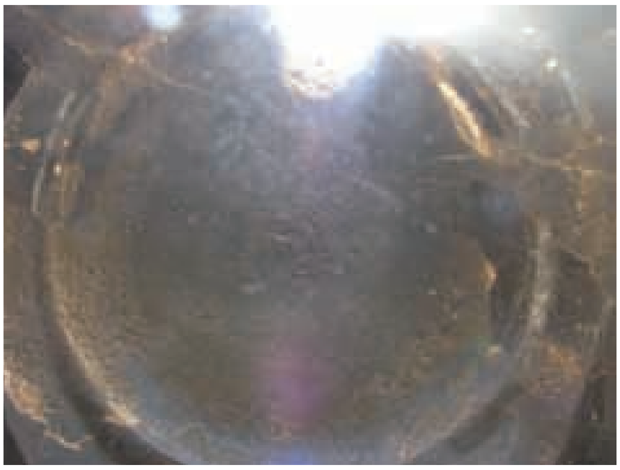


Figure 423 Cave E(i): ceiling.

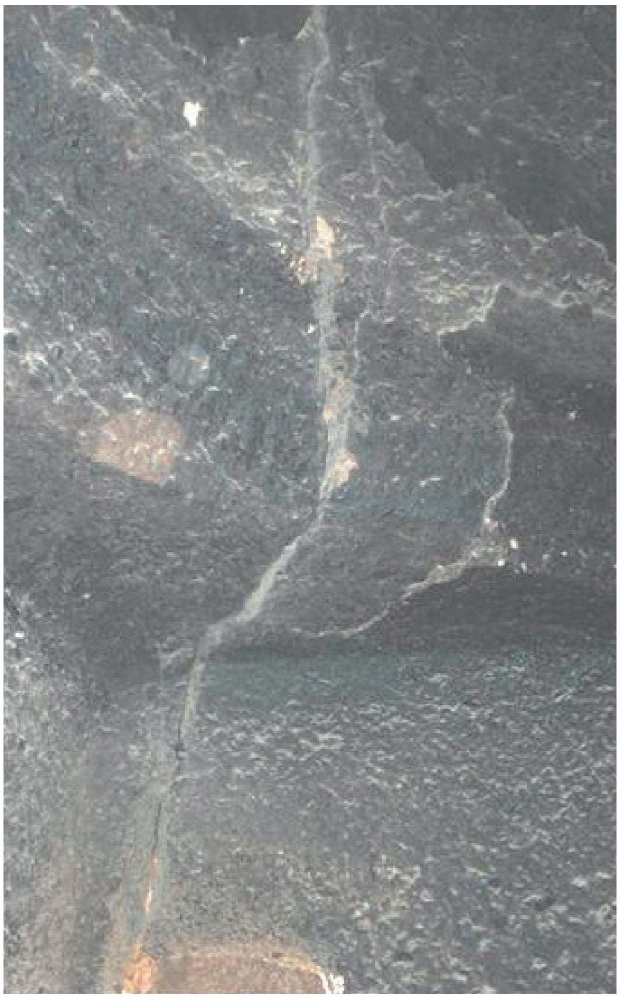


Figure 424 Cave E(i): crack above the west entrance.

Caves K

Location: Caves K are located halfway up the centre of the cliff. The staircase, which is situated west of the forecourt of Cave K3, has four steps and allows entry to Cave K(331), a cave with a rectangular plan. The southernmost stair at Cave K(331) continues downward and there is a passage to the west that leads to the forecourt of Cave K(332) and Cave K(333), both of which have rectangular plans.

Form: Cave K3, which is located on the eastern side, has a rectangular plan with a vaulted ceiling and a forecourt with a flat ceiling. All the floors of Caves K gradually decline from east to west.

Technique and design: Cave K3 has a simple rectangular plan, with three niches of different sizes on the northern, western and eastern sides (Figs 427, 428, 430). There is a frame around the east niche, with carved round hollowed shapes, which is rare in Bamiyan. Cave K(331) also has a niche at its north end, the level of which is more than 110 cm higher than the floor level of the cave (Fig. 432). There are mortises placed irregularly in Cave K3 and Cave K(331), however their use and relation to the original design are not clear. The stairs inside Cave K(331) and the opening that allows entry to Cave K(332) (Fig. 433), might not be original because of their locations and shapes. This means that Cave K(333) originally had an access point other than from Cave K3 and Cave K(331). These caves should not necessarily be categorised into the same group.

Present condition: All these caves have remnants of wall clay but only Cave K3 has the remains of wall paintings. Cave K(331) has a coloured layer on the wall, however its date of origin is not clear. Cave K3 and Cave K(331) have large vertical cracks that sometimes run through both caves. However, interestingly these cracks are not visible on the wall clay and wall paintings. This means that the wall clay and wall paintings were applied on top of these cracks.

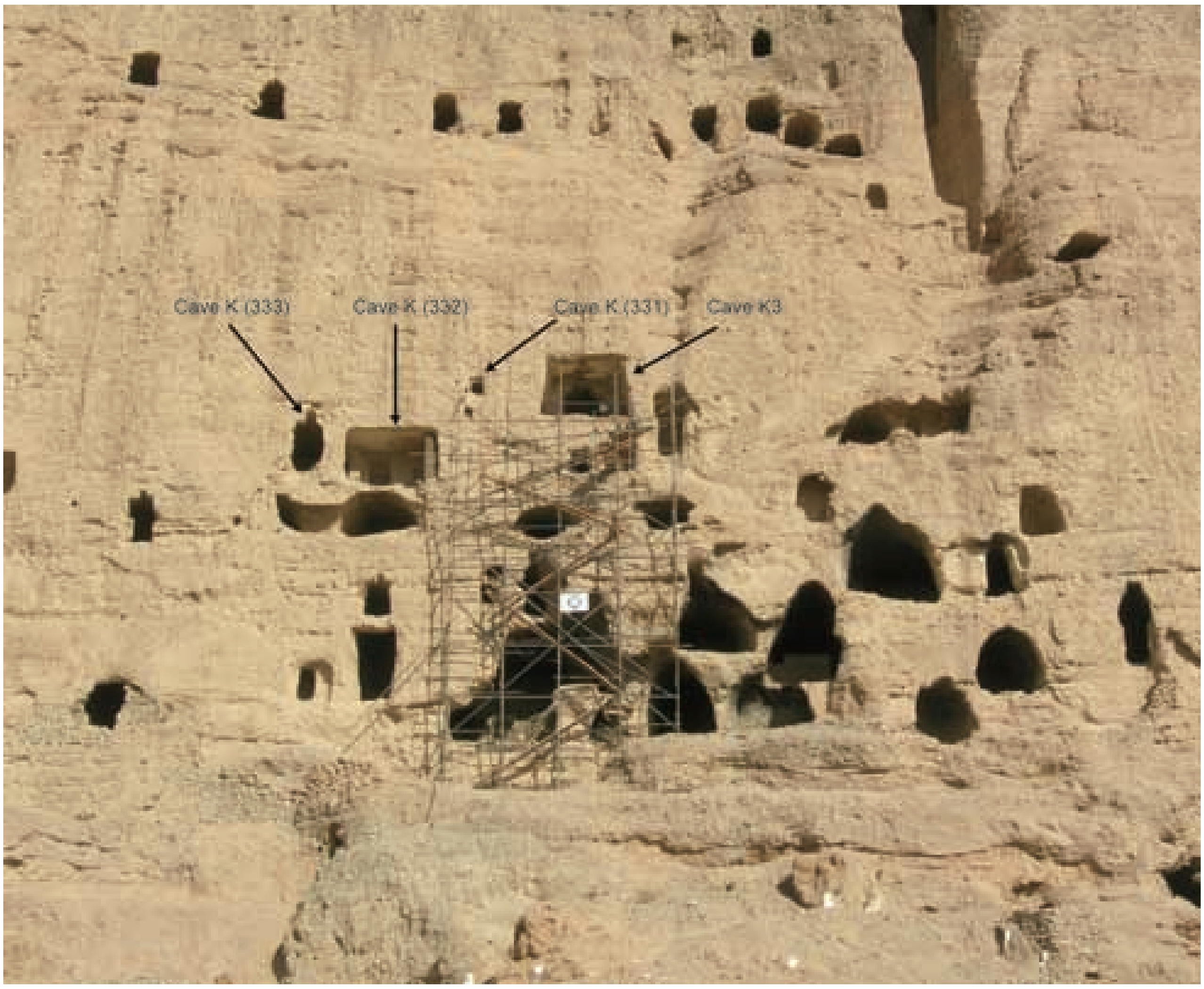


Figure 425 Caves K: general view.

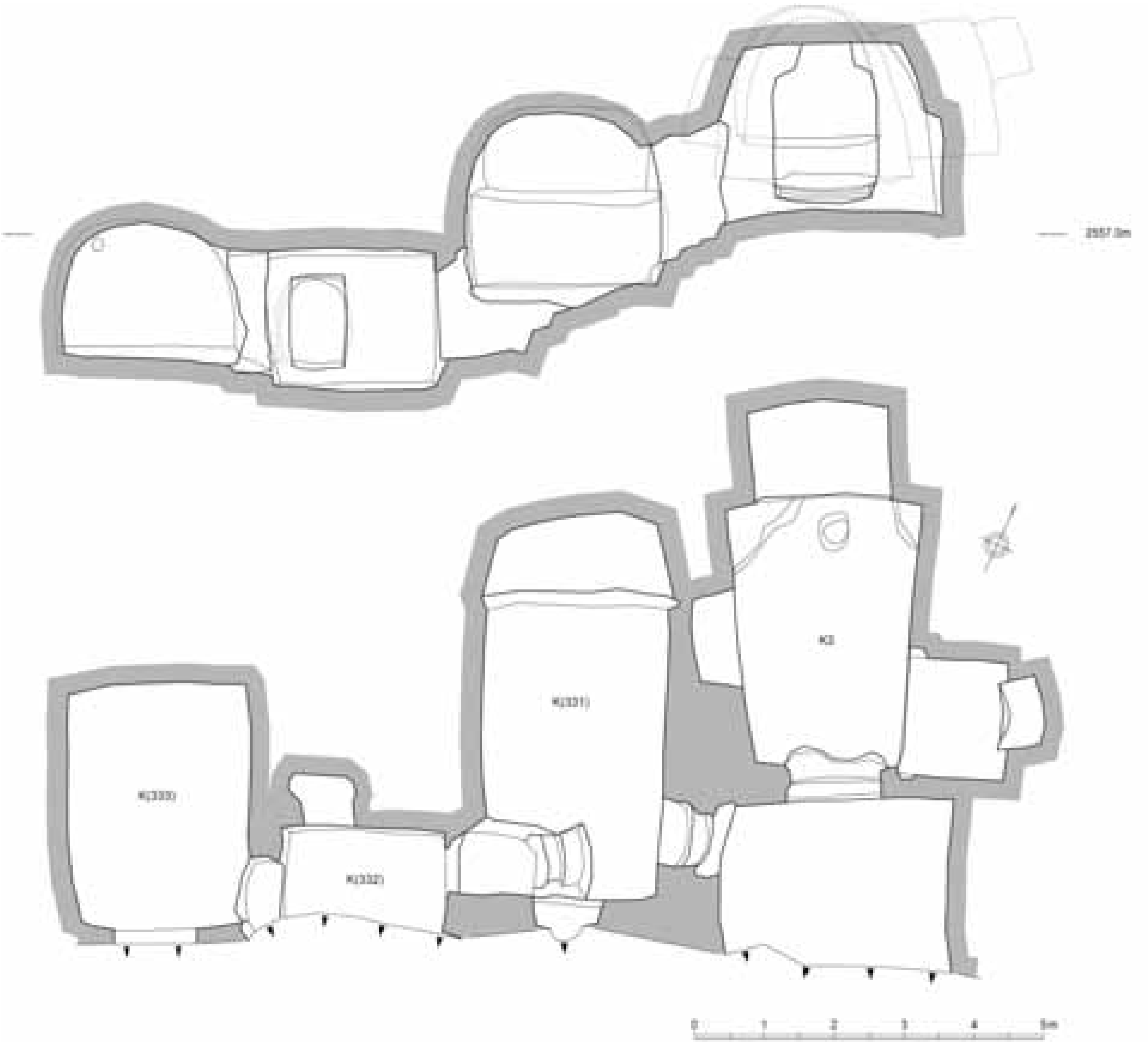


Figure 426 Caves K: plan; section (measured by PASCO Corporation, Japan, in 2005).

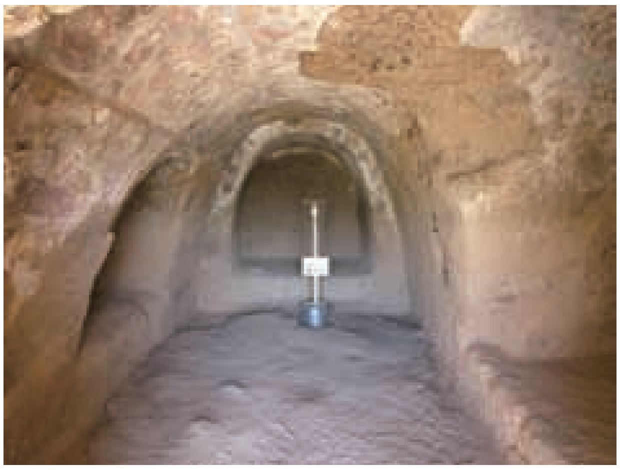


Figure 427 Cave K3: northern side.

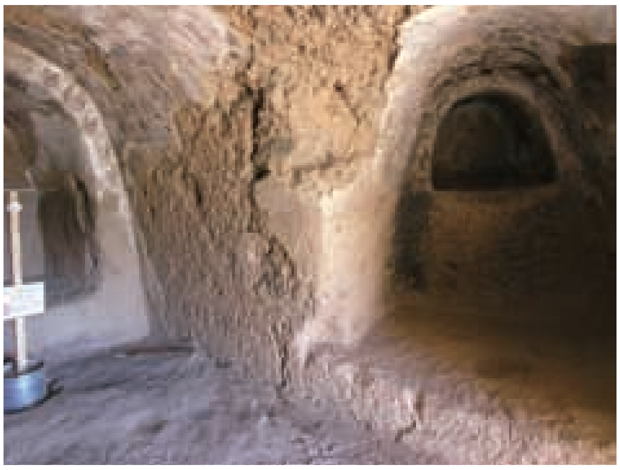


Figure 428 Cave K3: eastern side.

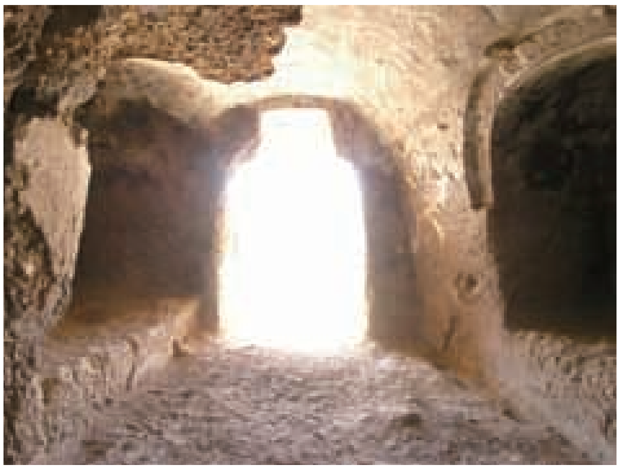


Figure 429 Cave K3: southern side.

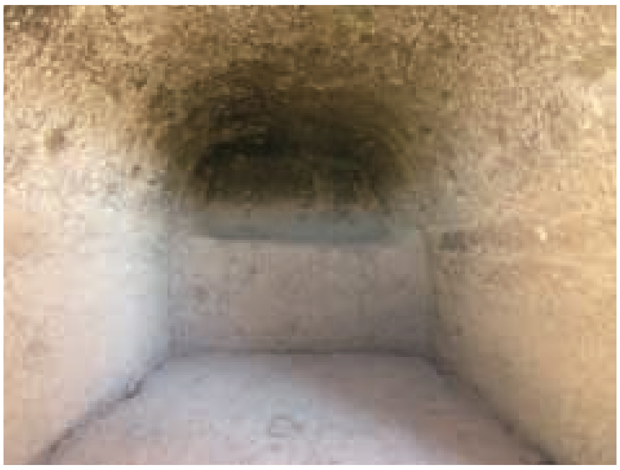


Figure 432 Cave K(331): northern side.

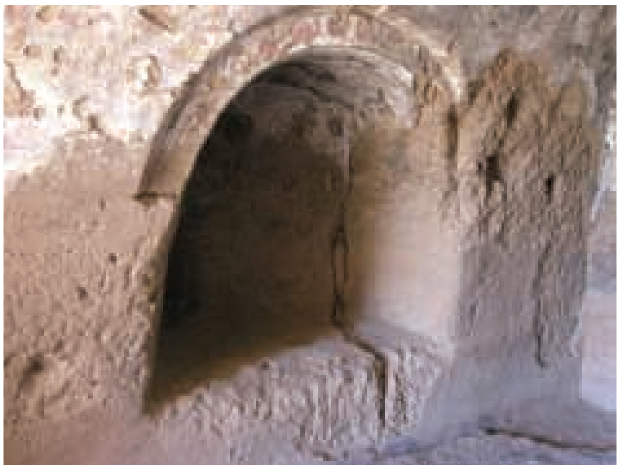


Figure 430 Cave K3: western niche.

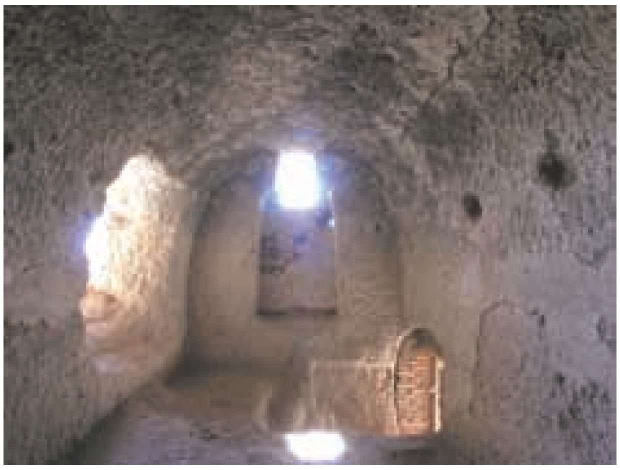


Figure 433 Cave K(331): southern side.

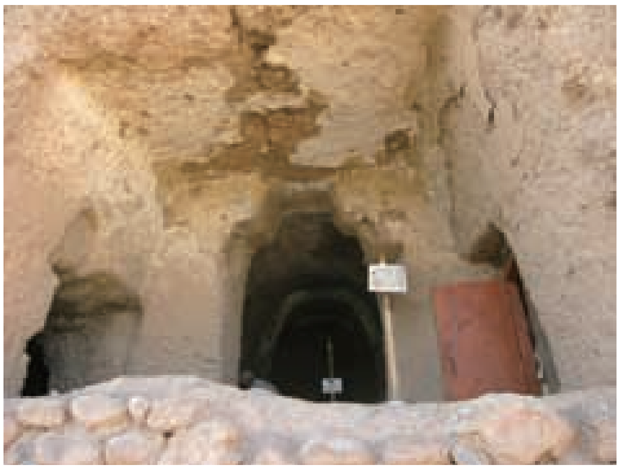


Figure 431 Cave K3: forecourt.

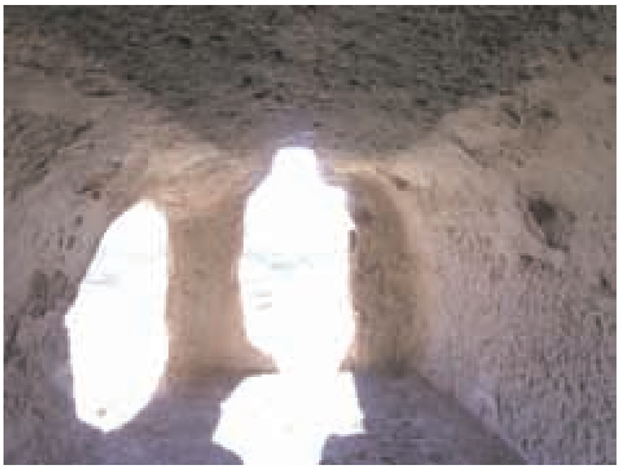


Figure 434 Cave K(333): southern side.

Caves J

Location: Caves J are located on the western side and halfway up the Bamiyan Great Cliff, between Caves K and H. Caves J consist of seven caves all connected by step corridors.

Form: Caves J have different floor levels: they are, from the highest point, Cave J(b) with a domed ceiling, Cave J(a) with a sitting Buddha, Cave J(c) and Cave J(g) with domed ceilings, Cave J(f) with a vaulted ceiling, Cave J(d) with a domed ceiling, and Cave J(e) with a vaulted ceiling. Except for Cave J(a) with a sitting Buddha, all of these caves have square plans. Each cave in Caves J contains a transitional component from the wall to the ceiling, with two steps. Only the tambour of Cave J(g) has squinches.

Technique and design: The walls are finished with several layers; for instance, under the black sooty material there are coloured layers in Caves J(e) and J(f), which have vaulted ceilings. Radiocarbon dating of the Susa indicates that this base coating layer dates to the end of the fifth century, one of the oldest components of the caves at Bamiyan. However, the colours also have several layers. The coloured layers on the lower parts of the walls in Cave J(b) are believed to have been made in a later period. The floor of the northern niche in Cave J(a) also has several layers (Fig. 436). It is assumed that these were also added later as in Cave J(b). Cave J(b) and Cave J(g) have bench-like bases along the walls on three sides (Figs 439, 444). Cave J(b) contains remains of a stupa at its centre. It is one of just a few such examples in Bamiyan.

Remnants of three-dimensional designs, such as a mortise and modelling, are not observed in any of the caves, except for the stepped transitional part and the bench-like base. Each entrance has a trapezoidal shape and grooves for a doorframe.

Present condition: Many caves are connected by step corridors and their structural conditions are good. Since several layers of clay wall on the walls and floors were observed in many of the caves, it is believed that they were in use at a later period.

There are remains of trapezoid-shaped depressions in the floor at the south part of Cave J(a), which is west of the cliff (Fig. 436). Both sides of the trapezoid shapes have square holes, believed to be remains of a wooden construction at the front. Cave J(e), Cave J(d) and the entrance of Cave J(f), which allows access upstairs, are closed by doors to protect the wall paintings.

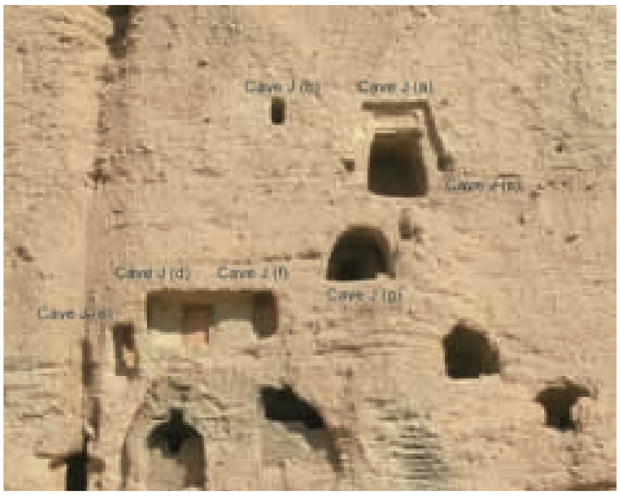


Figure 435 Caves J: general view.

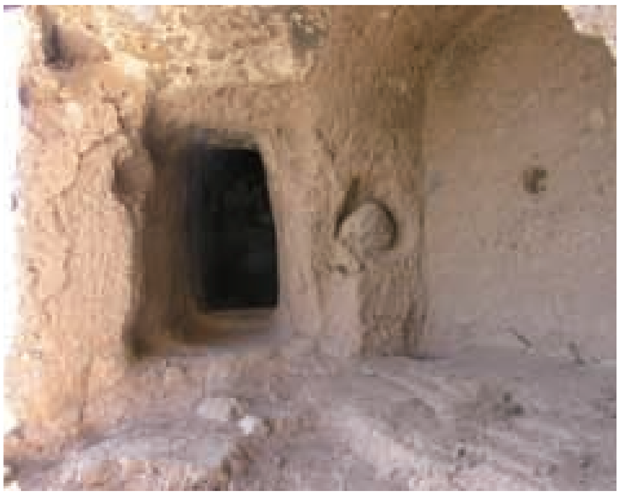


Figure 436 Cave J(a): western side.

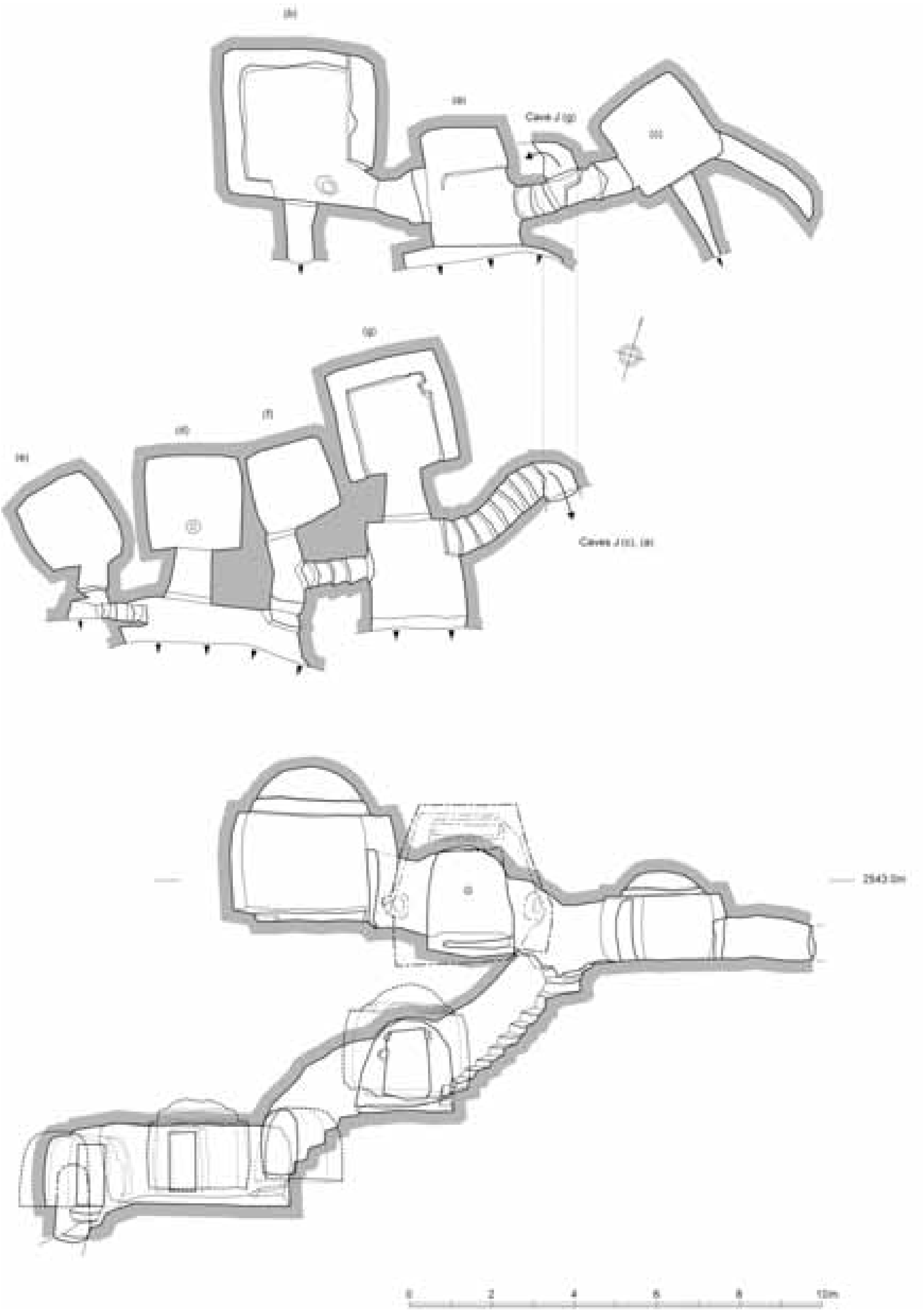


Figure 437 Caves J: plan; section (measured by PASCO Corporation, Japan, in 2005).

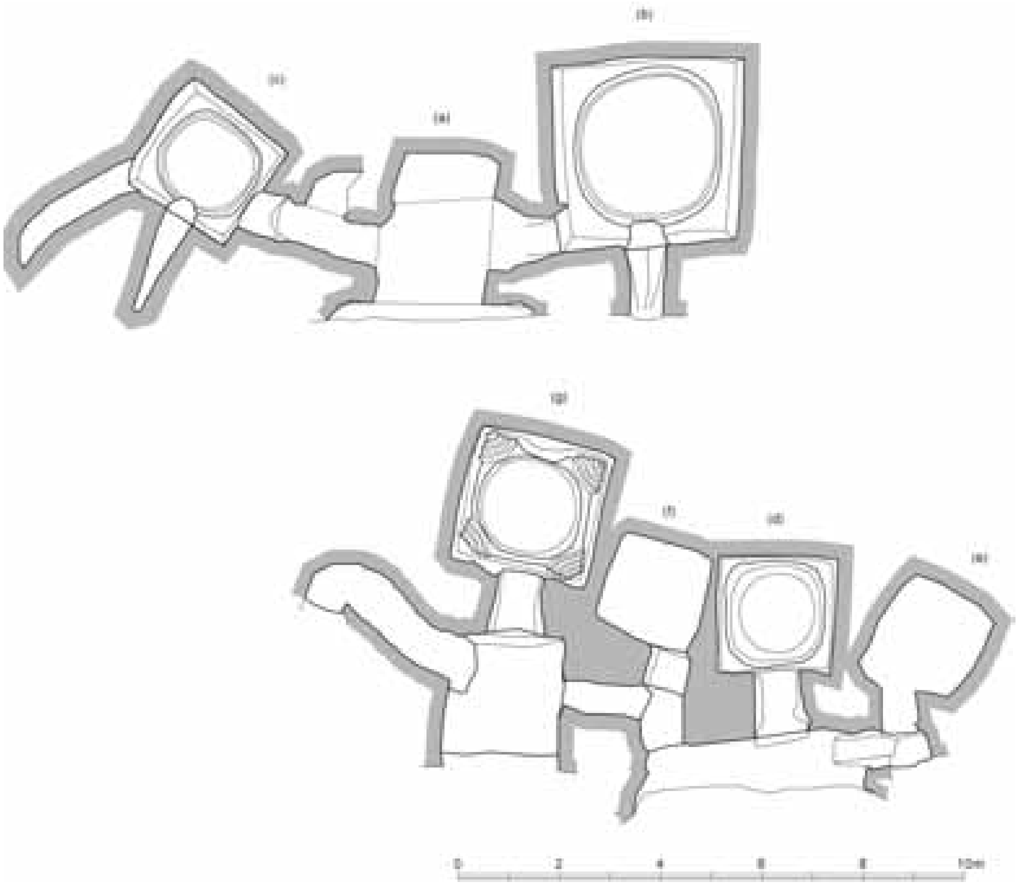


Figure 438 Caves J: ceiling (measured by PASCO Corporation, Japan, in 2005).

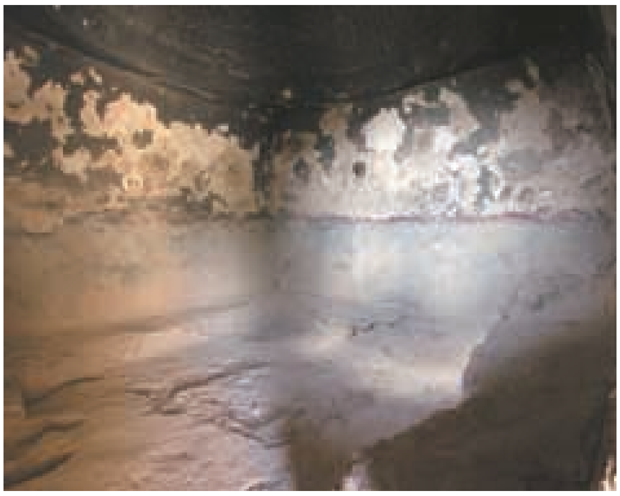


Figure 439 Cave J(b): northern side.

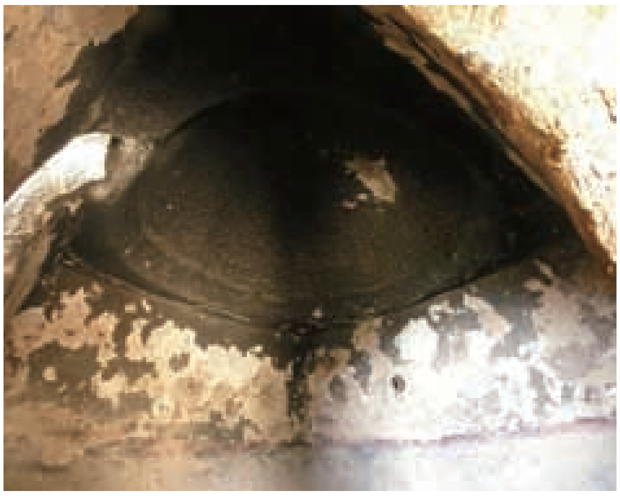


Figure 440 Cave J(b): ceiling.

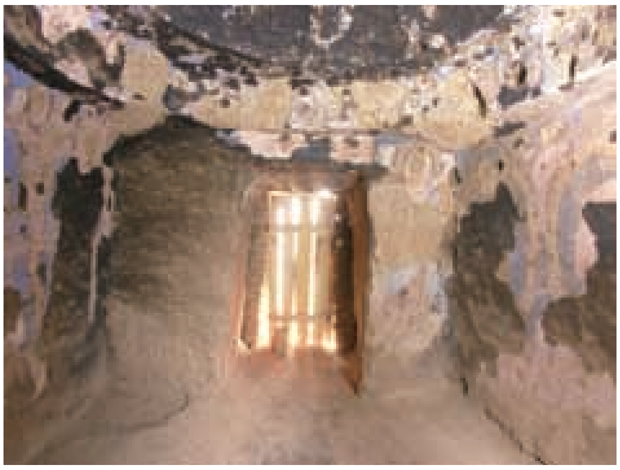


Figure 441 Cave J(d): southern side.

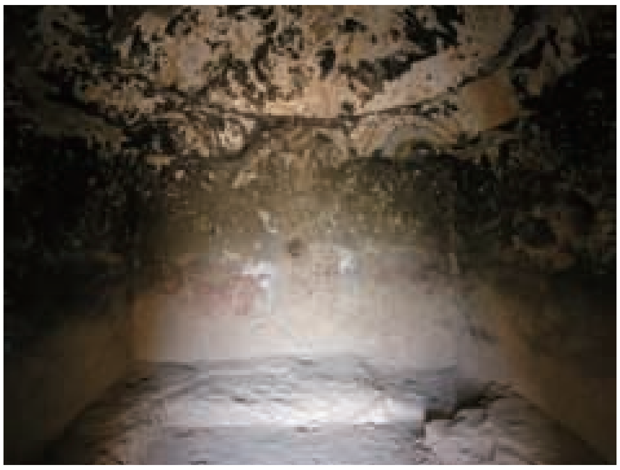


Figure 444 Cave J(g): northern side.

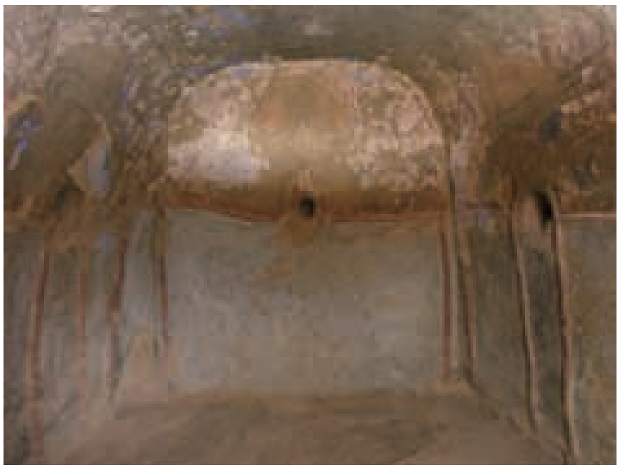


Figure 442 Cave J(e): northern side.

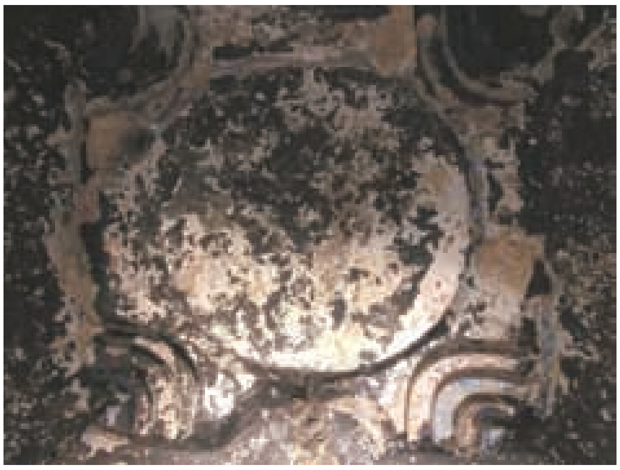


Figure 445 Cave J(g): ceiling.

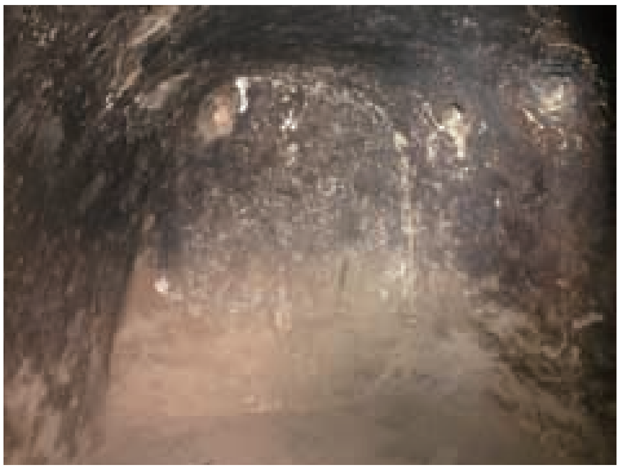


Figure 443 Cave J(f): northern side.

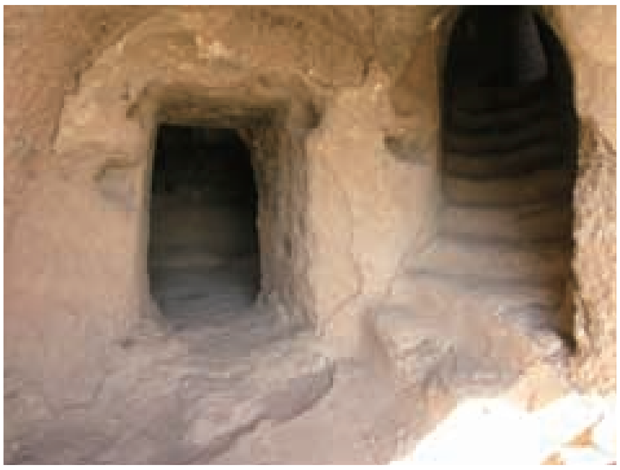


Figure 446 Cave J(e): entrance to Cave J(g) and a staircase.

Caves H

Location: Caves H are located in the eastern part of the Bamiyan Great Cliff, on the western side, between Caves J and N. They consist of a sitting Buddha niche and a cave with a square plan to the west.

Form: Cave H(a) is a sitting Buddha niche. It is around 13 m high, relatively large for Bamiyan, with a pilgrimage route that worked its way around the cave. Cave H(b), which has a square plan with a *laternen-decke*, is located just west of Cave H(a) and apparently attached to it.

Technique and design: An ogee-arched frame is carved out at the top of the sitting Buddha niche's opening. The shoulder parts of the trapezoid-shaped opening below are not curved. This design is different from that of the caves in the East cave-niche, Cave I and Cave E(c). There are regular horizontal grooves at the front, believed to be remains of a wooden construction. There are remnants of 10 grooves in a row, which are thought to have been used to fix wooden beams to support a cantilever terrace at the feet of the Buddha. Moreover, the side walls are around 180–190 m high and feature several aligned square holes about 20 × 20 cm in size (Figs 448, 451). Grooves running from east to west are carved out at the front and lower part of the sitting Buddha niche, however the original height has not been established. It is possible that a row of wooden constructions used to exist here.

Cave H(b) is small with a square plan. The ceiling is a *laternen-decke* (Fig. 455), which is not high, with a small dome carved out of its centre. The interior is covered by a black material that looks like soot.

Present condition: The sitting Buddha is almost completely destroyed and only half of the western part of the pilgrimage route is visible. Since pieces of wall painting, assumed to have peeled off of the ceiling, were observed on the floor, it is clear that the deterioration of the wall clay and wall painting is ongoing. There is a large structural crack, which runs parallel to the cliff, on the east–west side wall of the sitting Buddha niche. This crack passes the entrance of Cave H(b), which is located next to the sitting Buddha niche, at the cliff's side and continues to the inside (Fig. 452).

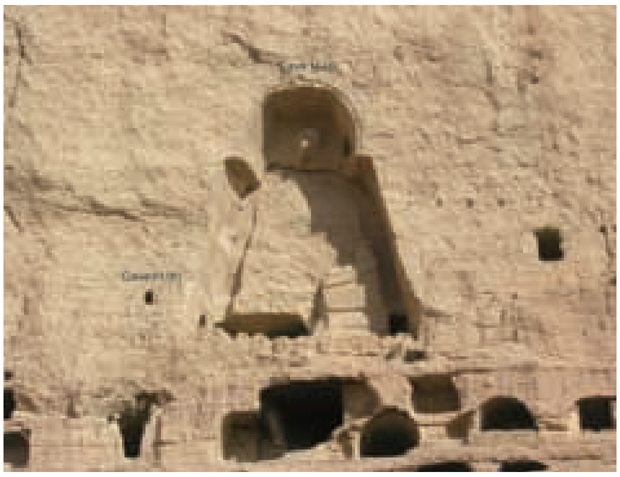


Figure 447 Caves H: general view.

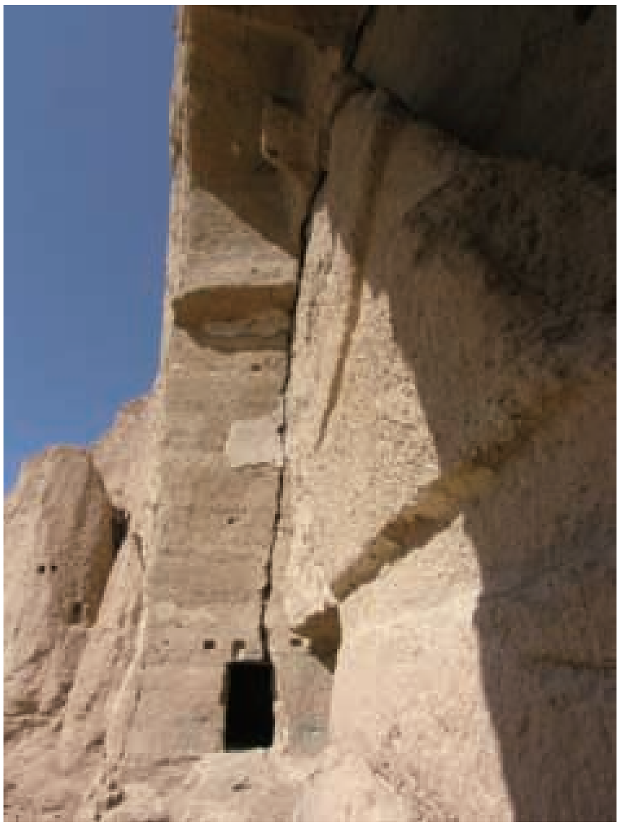


Figure 448 Cave H(a): western side (measured by PASCO Corporation, Japan, in 2005).

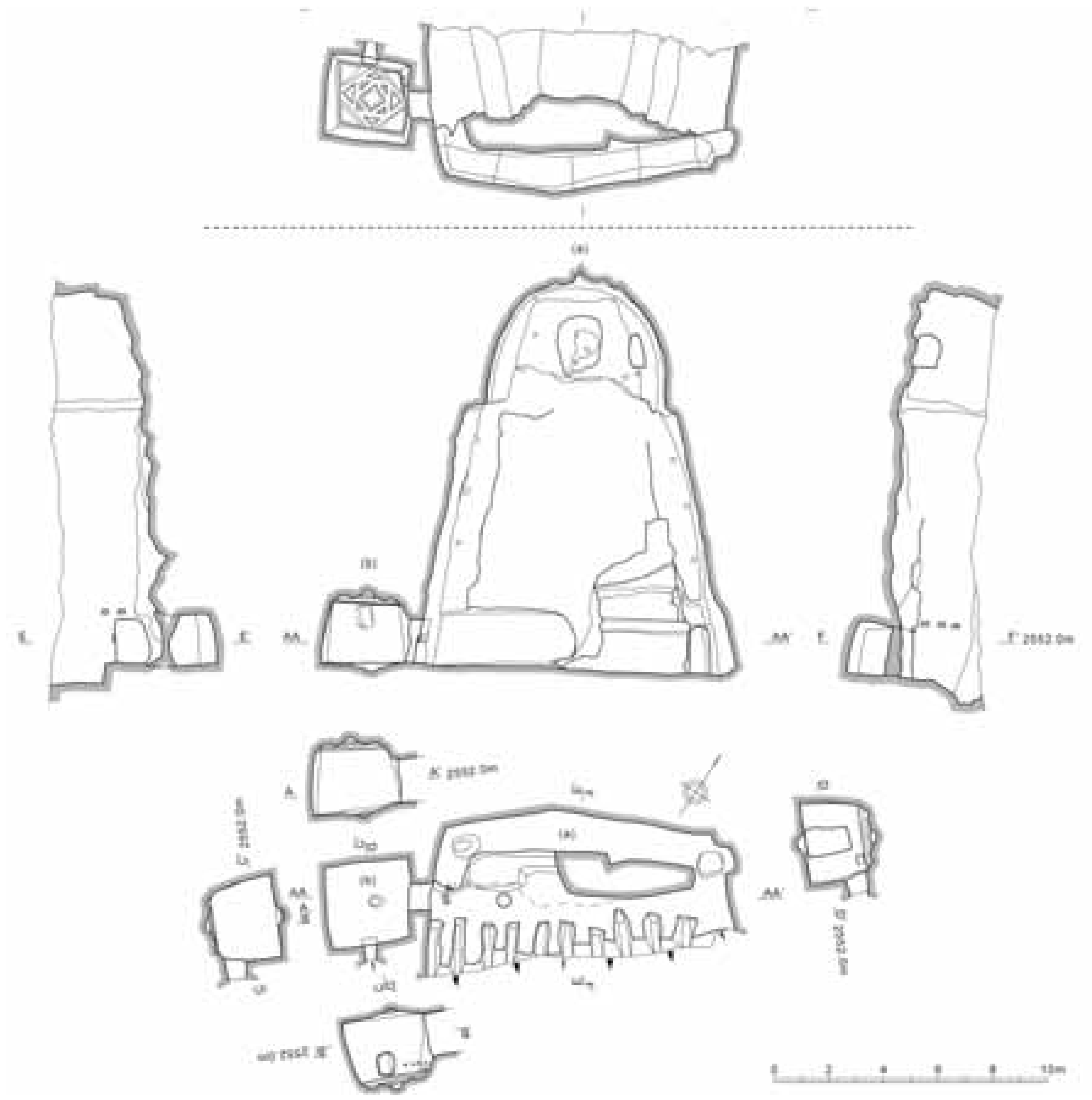


Figure 449 Caves H: plan; elevation; section; ceiling.

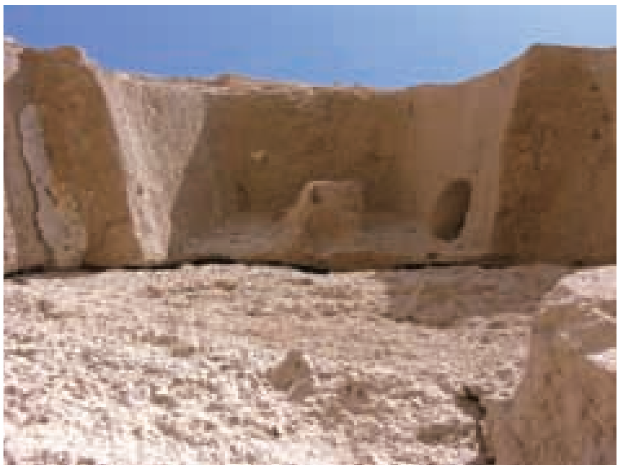


Figure 450 Cave H(a): ceiling.

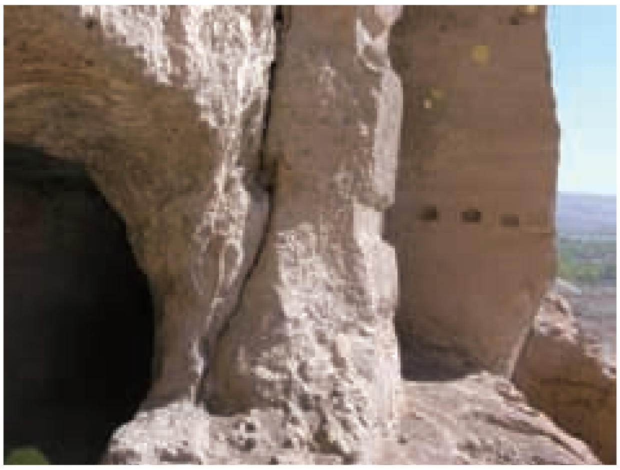


Figure 451 Cave H(a): eastern side.

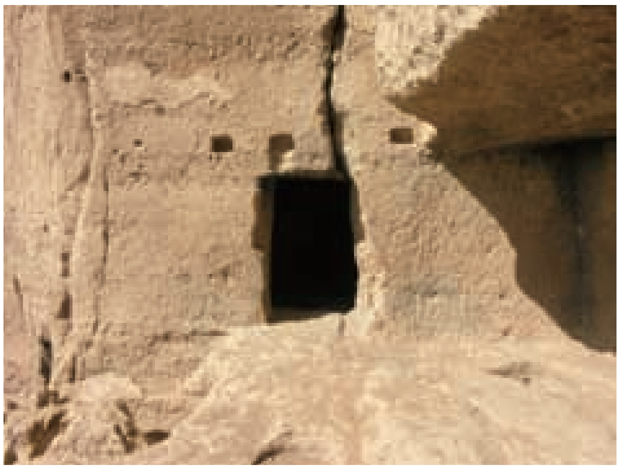


Figure 452 Cave H(b): crack near the entrance.

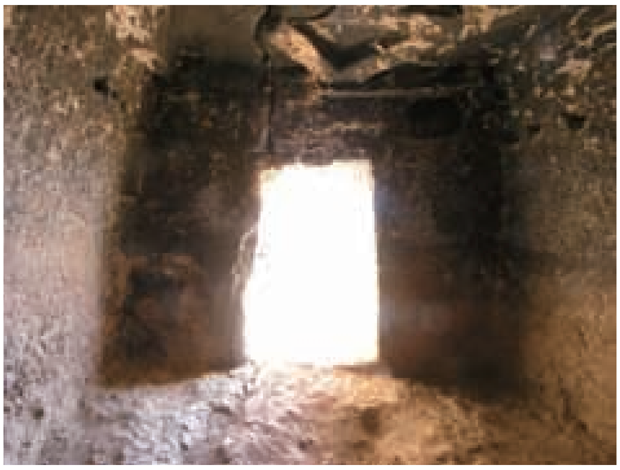


Figure 454 Cave H(b): eastern side.

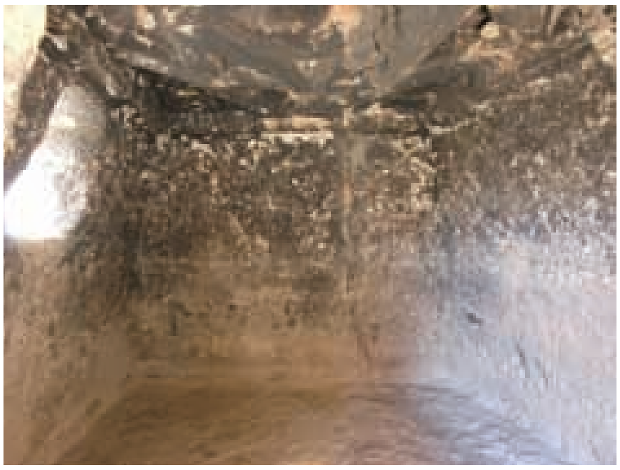


Figure 453 Cave H(b): western side.

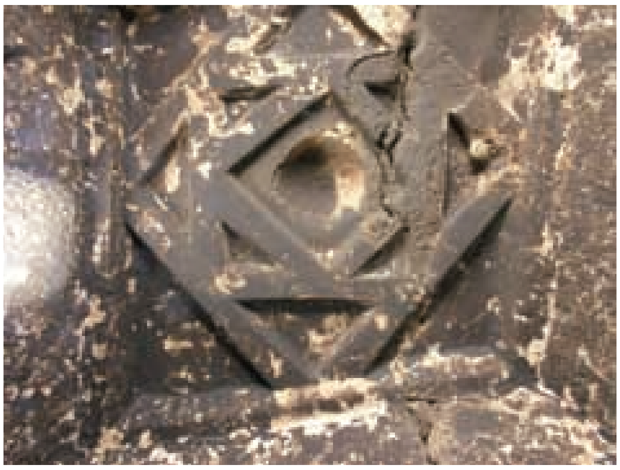


Figure 455 Cave H(b): ceiling.

Caves N

Location: Caves N are located on the eastern half of the Bamiyan Great Cliff, on the western side, between Caves H and I. Caves N consist of nine caves, N(a)–N(i), and their shapes are mainly rectangular.

Form: The only cave with a square plan and a *laternen-decke* is Cave N(a), on the western side. The others have rectangular plans with vaulted or flat ceilings. Cave N(h) is more than 5 m deep and over 10 m high, and thus is one of the larger rectangular caves in Bamiyan.

Technique and design: Cave N(a), which has a *laternen-decke*, also has partial remains of wall paintings. It is the cave with the best-preserved original design among the caves of Caves N (Figs 460, 461). The *laternen-decke* does not have much height; in fact it is rather flat. Its centre portion is painted and does not have a small dome. There are grooves for wooden constructions at the cliff surface, above Caves H(g) and H(h). The passages from Cave N(c) to N(d) (Fig. 464), and from N(g) to N(h) via N(f) (Fig. 465), are believed to have been added in a later period, based on their shapes and methods of construction. Therefore, Caves N were originally three groups of caves: Caves N(a)–N(c), Caves N(d)–N(f), and Caves N(h) and N(i). It is believed that each cave was accessed directly by southern entrances. Based on their layout, heights and locations, the three groups of caves are different, and so, not only the horizontal, but the vertical relationships with the surrounding caves must be considered.

Present condition: The vaulted ceiling in Cave N(h) (Figs 466, 467) is finely finished with a chisel, but the side walls and the ceiling look unfinished. Solid rock even juts out at one point on the side walls. It is believed that the caves were expanded during a later period. The southern side of the cliff, between Cave N(a) and Cave N(f), has collapsed, and there is a large structural crack 6–7 cm wide that runs near and parallel to the cliff surface of Cave N(a). The condition is quite severe and dangerous (Fig. 468).

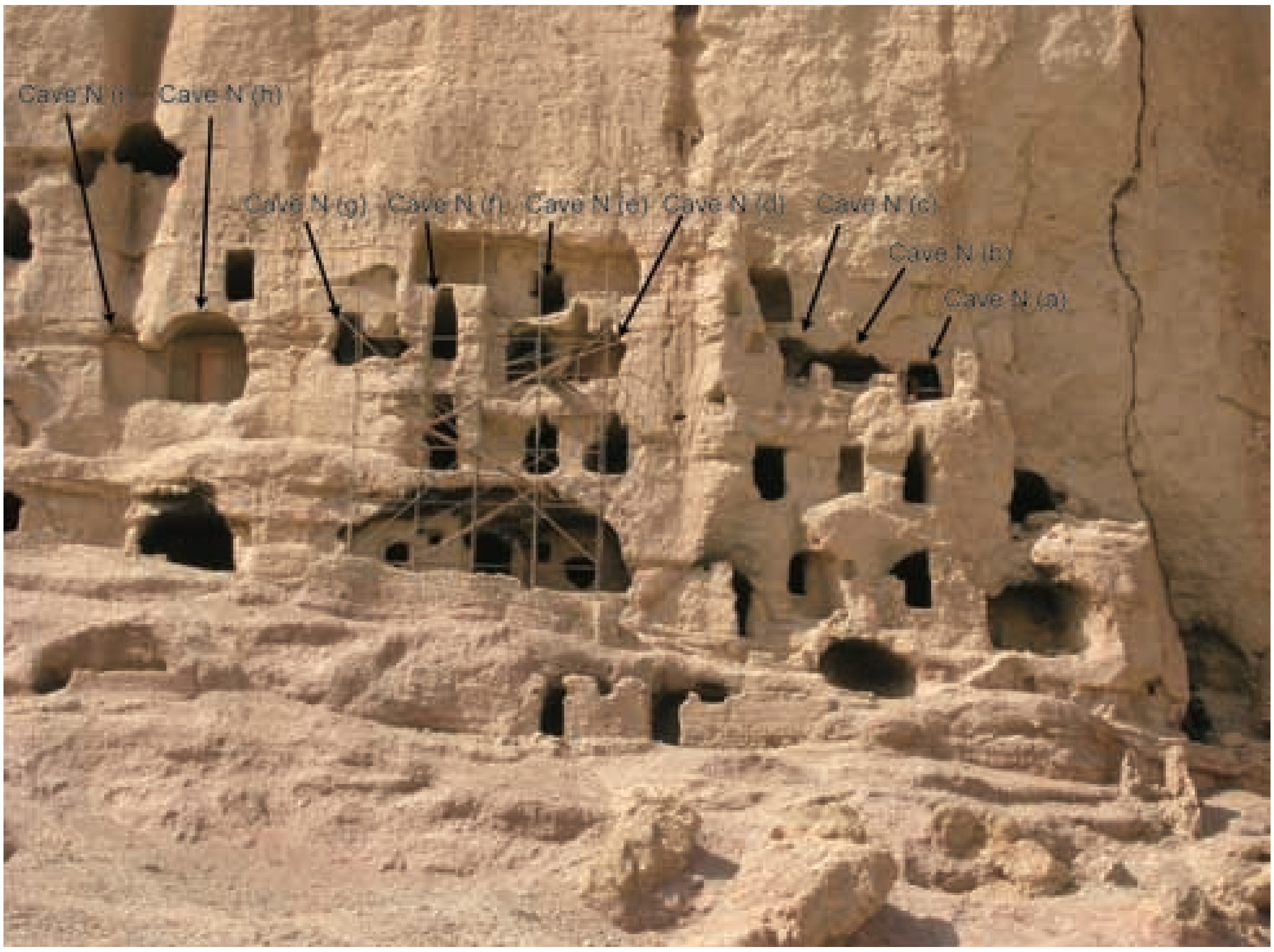


Figure 456 Caves N: general view.

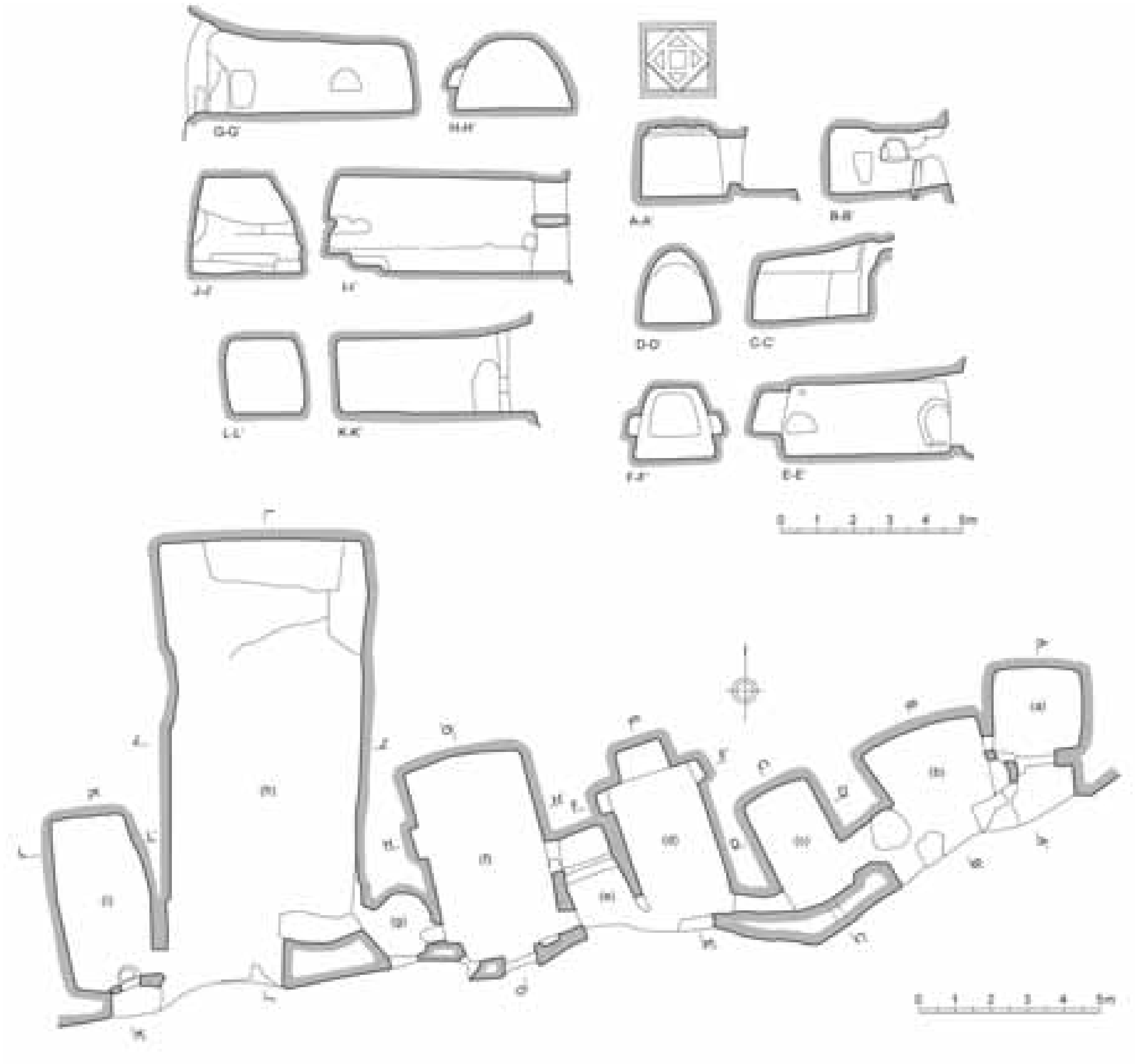


Figure 457 Caves N: plan; section. Cave N(a): ceiling (after Kodera *et al*. 1971).

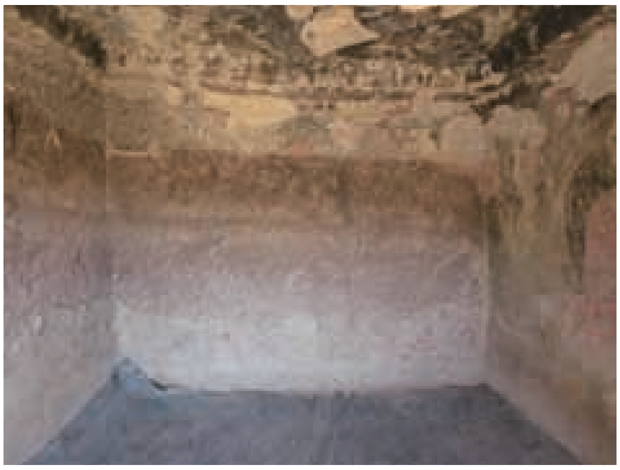


Figure 458 Cave N(a): northern side.

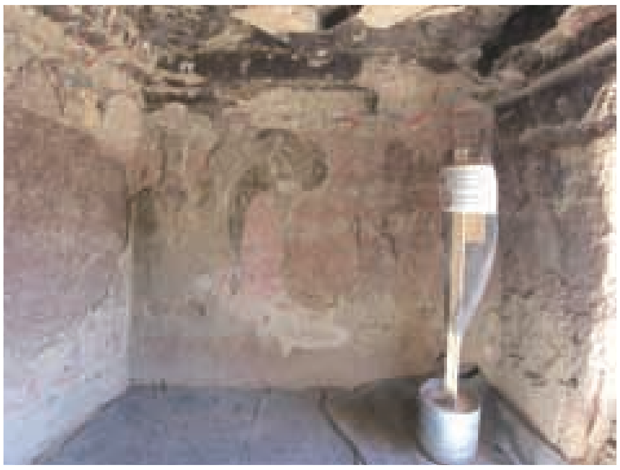


Figure 459 Cave N(a): eastern side.

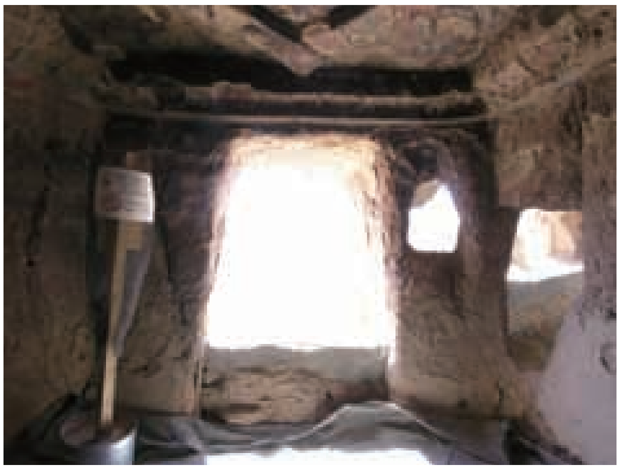


Figure 460 Cave N(a): southern side.

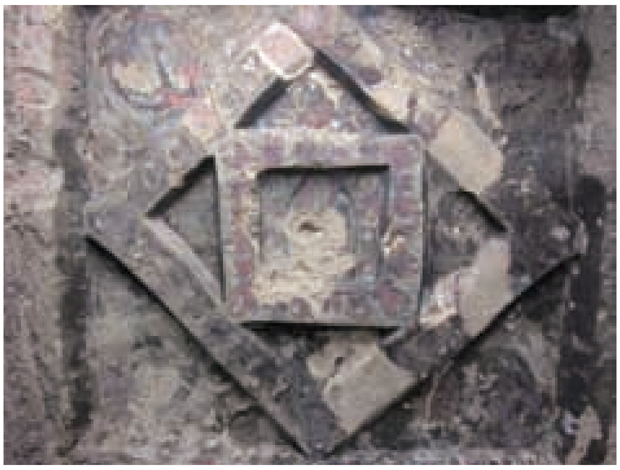


Figure 461 Cave N(a): ceiling.

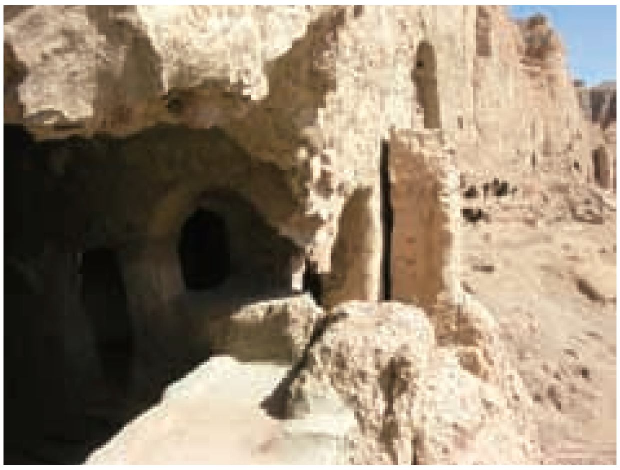


Figure 462 Cave N(b): eastern side.

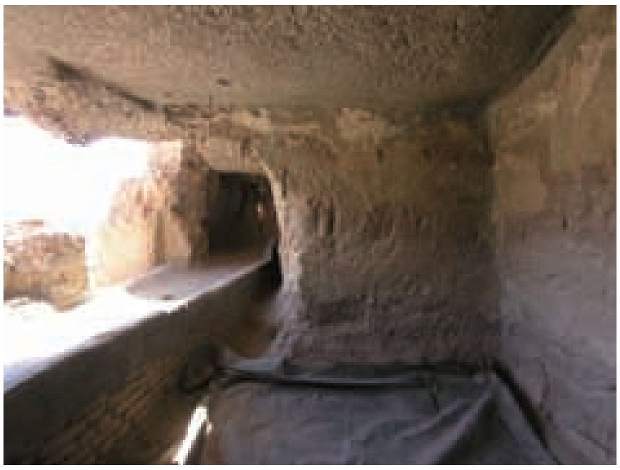


Figure 463 Cave N(b): western side.

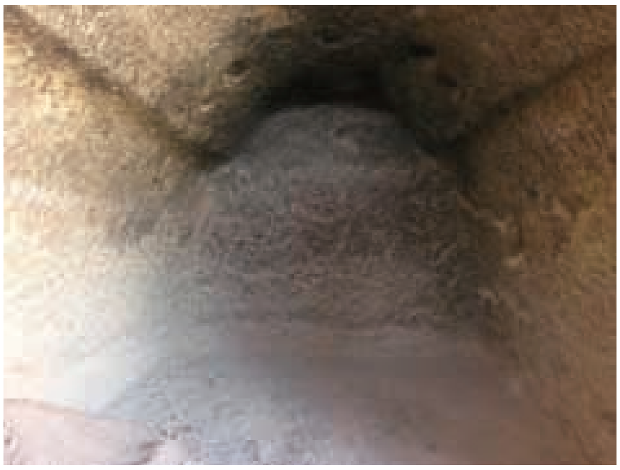


Figure 464 Cave N(c): northern side.

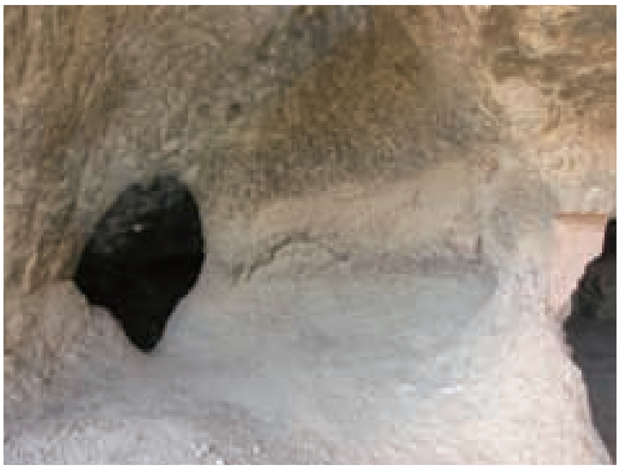


Figure 465 Cave N(g): northern side.

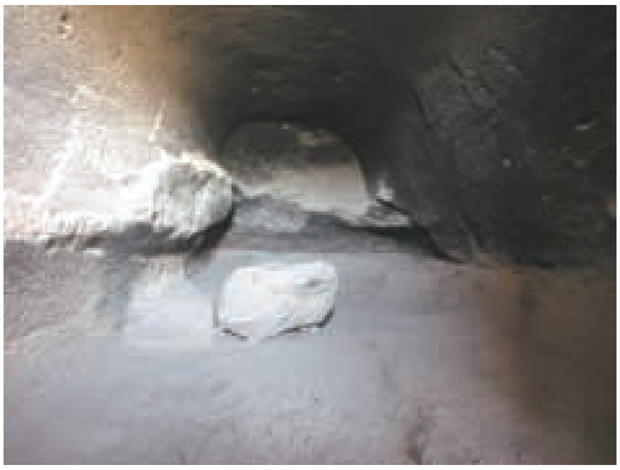


Figure 466 Cave N(h): northern side.

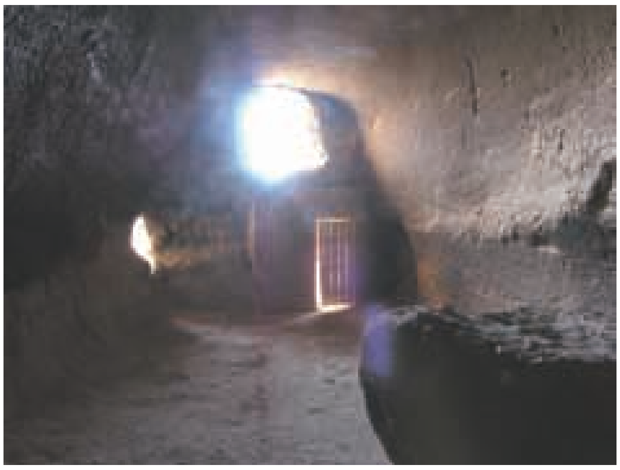


Figure 467 Cave N(h): southern side.

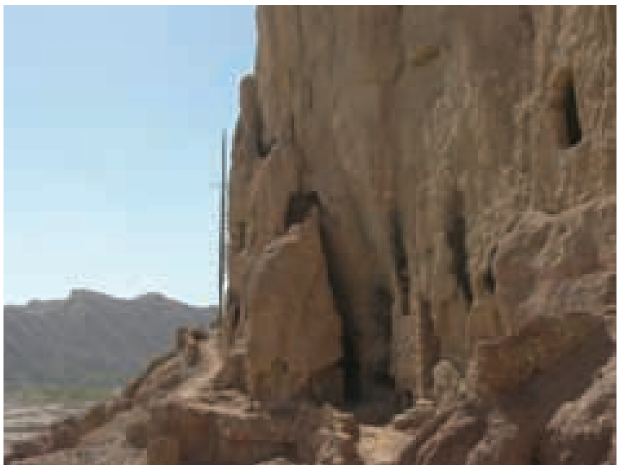


Figure 468 Caves N: view of the crack on the cliff surface.

Caves O

Location: Caves O are located near the western and lower area of Caves N.

Form: Cave O(a) has an octagonal plan with a hexagonal, star-shaped ceiling, which was carved out. Cave O(b), which is next to Cave O(a), has a rectangular plan with a flat ceiling.

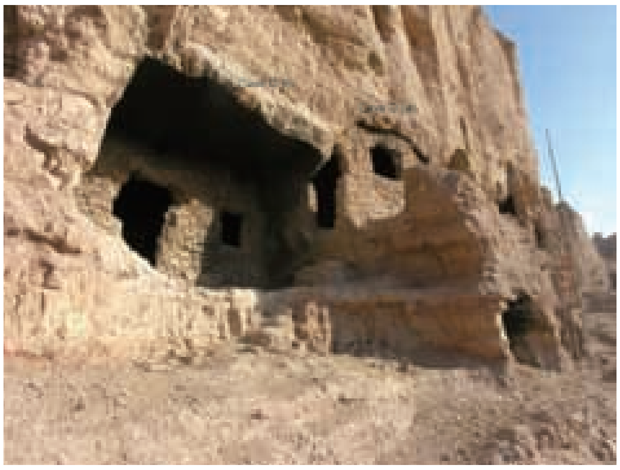


Figure 469 Caves O: general view.

Technique and design: The northern niche of Cave O(a) has an ogee-arched frame on top and forms on either side, presumably designed as columns (Fig. 471). A hexagonal star, which consists of two triangles, is carved out of the ceiling in Cave O(a) (Figs 472, 473). This design is quite unique in Bamiyan. A small dome is carved out at the centre of the star. It is believed that the design concept evolved from a three-dimensional to a flat design. Forms with a dome at the centre are also observed in the other caves; however, the designs of the hexagonal shape and two crossing triangles are unique. Cave O(b) also has a niche on the northern wall (Fig. 474). This niche has an arched frame similar to that in Cave O(a), but it does not have a pointed shape on top.

Present condition: Cave O(a) has remains of finishing wall clay on one part of the ceiling. The southern parts of Caves O(a) and O(b) have both collapsed. In particular, half of the ceiling in Cave O(a) is currently missing. The interiors of both caves are covered by a black material that looks like soot. Both caves have visible evidence of renovation works carried out during their use as residences. For instance, in Cave O(a), there are the remains of a fireplace in front of the niche, and both caves have new walls and entrances.

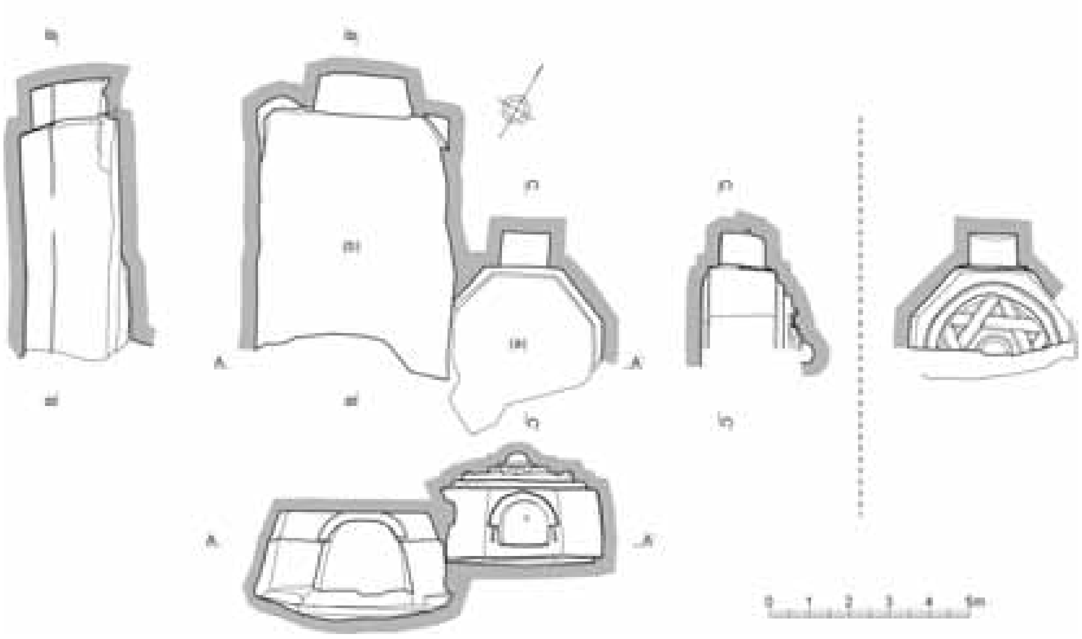


Figure 470 Caves O: plan; section. Cave O(a): ceiling (measured by PASCO Corporation, Japan, in 2005 and 2007).

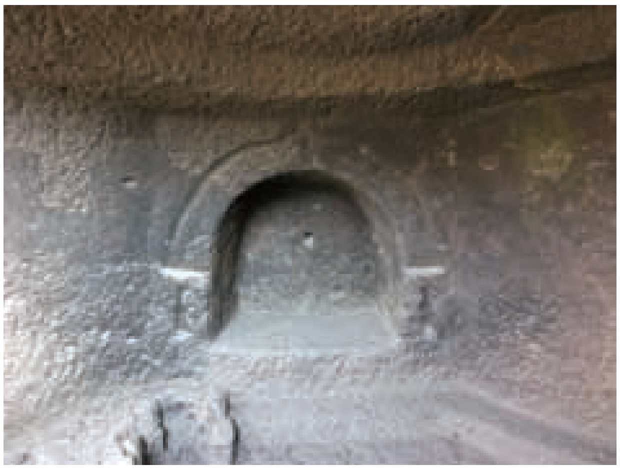


Figure 471 Cave O(a): northern side.

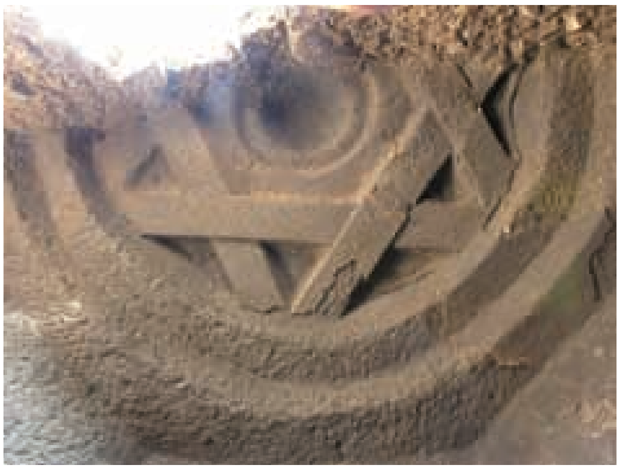


Figure 473 Cave O(a): ceiling.

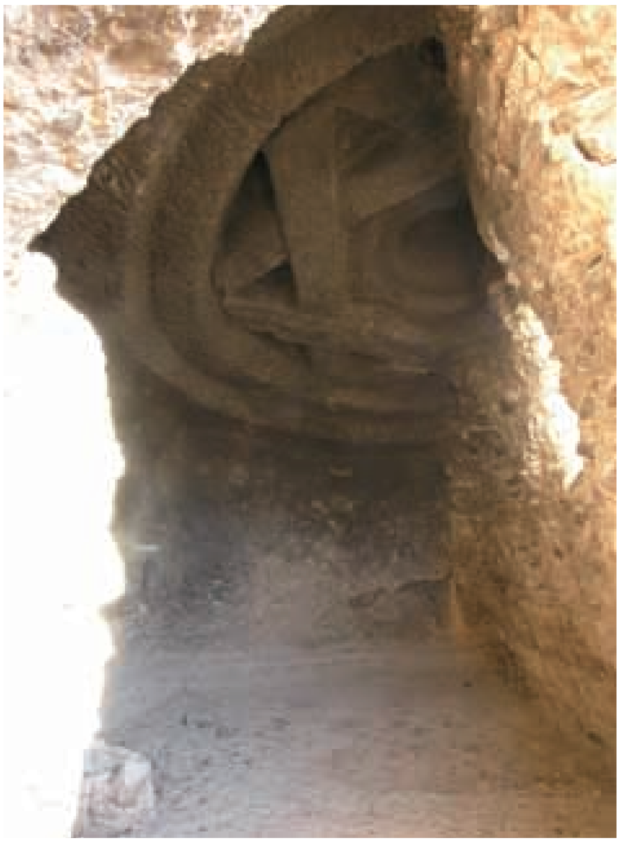


Figure 472 Cave O(a): southern side.

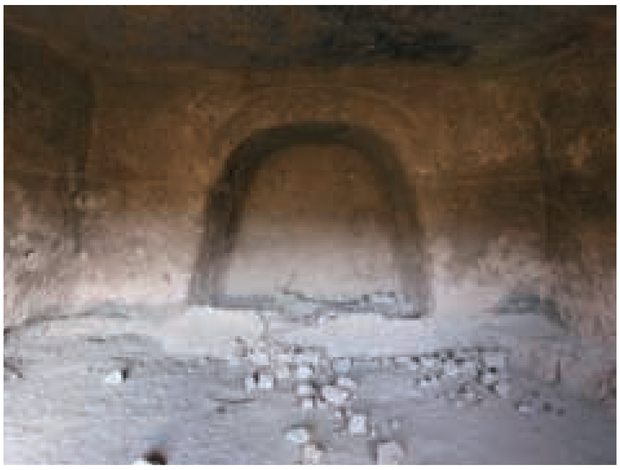


Figure 474 Cave O(b): northern side.

Cave I

Location: Cave I is located on the eastern side of the Bamiyan Great Cliff, between the West cave-niche and Caves H. Here, the cliff surface is straight, and it is accessed via a long step corridor from Cave 529, which is situated about 15 m below.

Form: Cave I features a sitting Buddha niche that is more than 5 m high. The opening at the shoulder parts of the Buddha steps inwards, forming a trefoil arch. There is a pilgrimage route around the sitting Buddha.

Technique and design: The pilgrimage route has paintings of statues and the ceiling of the niche is painted with scenes of court dances and musical performances (Fig. 476). There are circular holes with a diameter of approximately 20 cm at the edge of the existing pedestal for the Buddha, near the floor. They might have been used as mortises for beams, which were part of the pedestal. Moreover, there are four grooves each on the front of the pedestal and on the floor, believed to have been created for the terrace that was constructed in front of the niche. Since these grooves are not very deep, it is assumed that the terrace was not very deep.

Present condition: Only the pedestal has survived, and the wall painting that supposedly covered the entire niche can be observed on the ceiling and along part of the pilgrimage route. There are several large cracks that run parallel to the cliff at the step corridor to Caves I, near the surface of the cliff, and along the pilgrimage route. Since a large crack exists underneath the top surface of the side walls of the pilgrimage route, not visible on the surface, it is believed that the crack already existed before construction. Since the step corridor that leads to Caves I (Fig. 479) is deteriorated and the surface of the steps transformed into slopes, access to Caves I is dangerous.

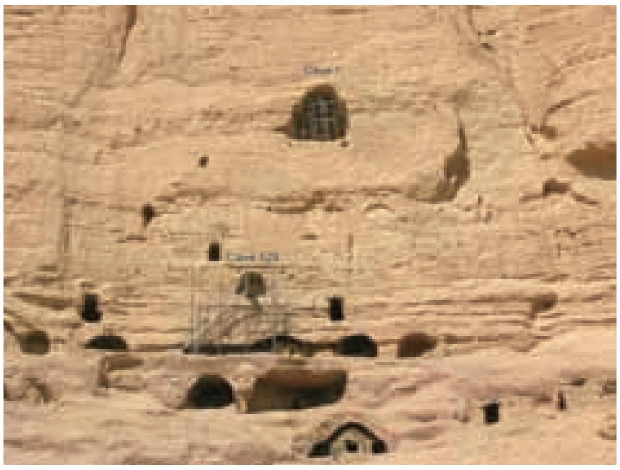


Figure 475 Cave I: general view.

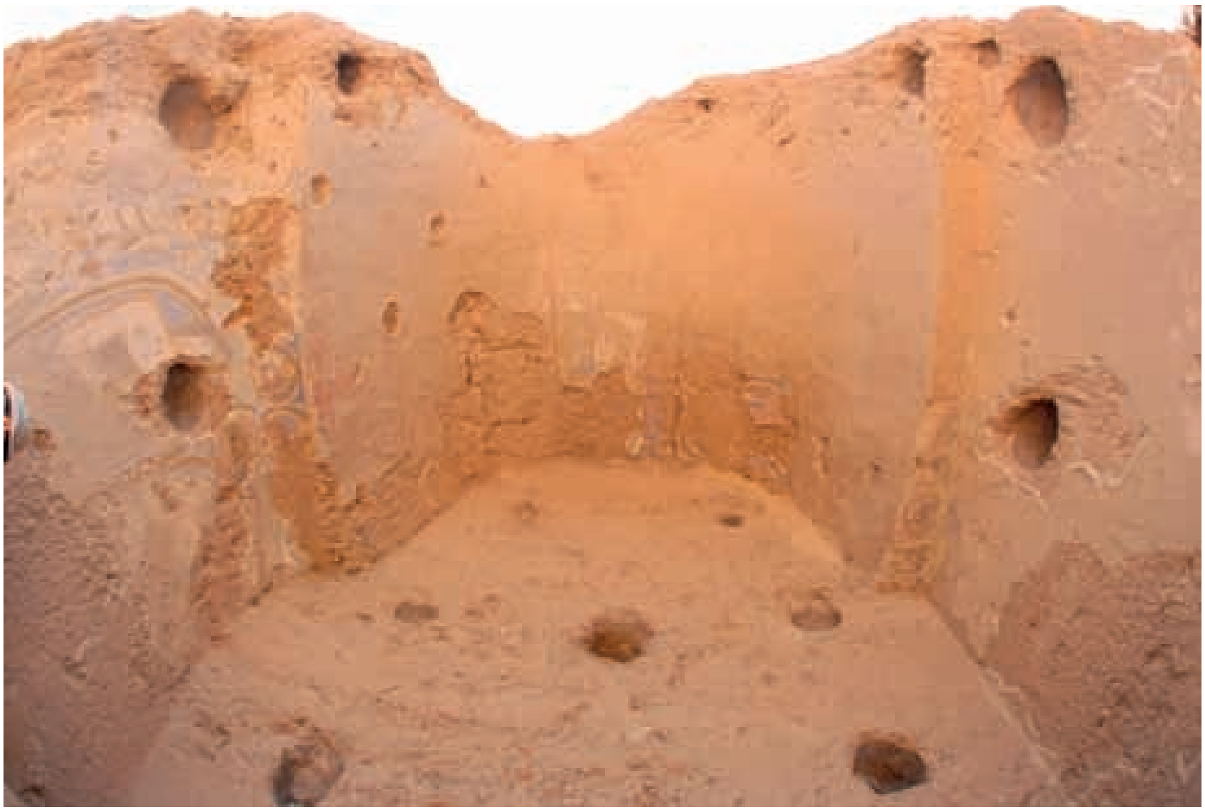


Figure 476 Cave I: ceiling.

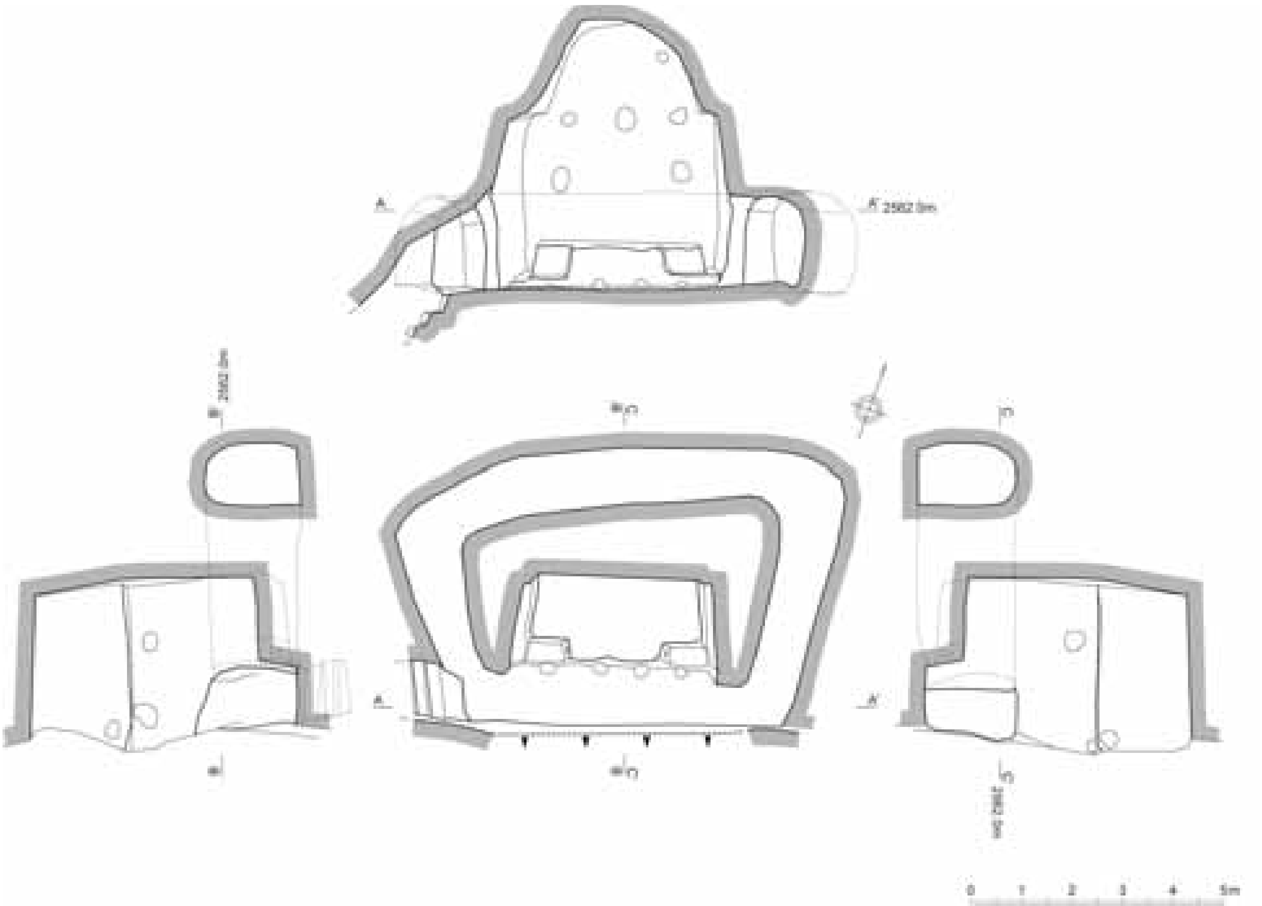


Figure 477 Cave I: plan; section; elevation (measured by PASCO Corporation, Japan, in 2005).

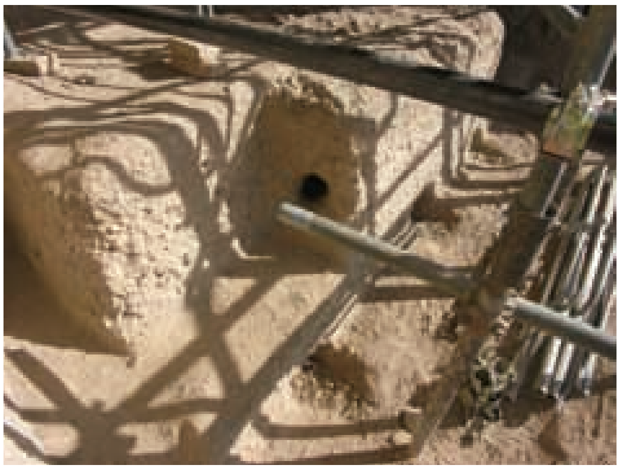


Figure 478 Cave I: pedestal.

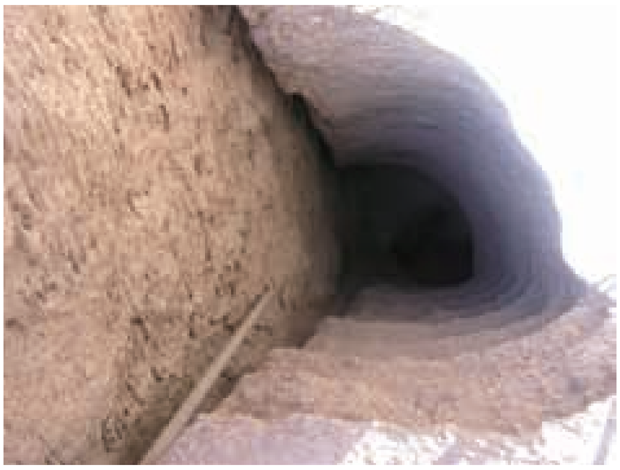


Figure 479 Step corridor to Cave I with cracks.

Cave Z1

Location: Cave Z1 is located on the eastern side of the West cave-niche at the height of the Buddha's shoulder.

Form: Cave Z1 has an irregular octagonal plan with a domed ceiling, which has two steps. It is a small cave about 4 m deep. In front of the vaulted entrance, which is 1.4 m wide and 1 m deep, there is an opening, around 2 m deep to the cliff surface, which is considered to be either a passage to the cave or a kind of forecourt.

Technique and design: The base coating layer of the wall painting has been determined, by the examination of the Susa, to date from approximately the end of the eighth or the ninth century. The same cave form, with an octagonal plan and a domed ceiling without a tambour, can be found at Cave Z(c), near Cave Z1, and in a few caves at Kakrak Caves 43; however, it is relatively rare in Bamiyan. The ceiling is covered by black sooty material, but the Thousand Buddhas are still visible. This form, with a narrow vaulted passage or forecourt, is also rare in Bamiyan.

Present condition: The ceiling and walls are covered by black sooty material. Paintings remain on the ceiling; in order to protect these paintings, the entrance is closed. There are 3 mm-wide cracks, on top of which is a wall clay layer, assumed to have been added in a later period. Therefore, the length of the cracks cannot be defined.

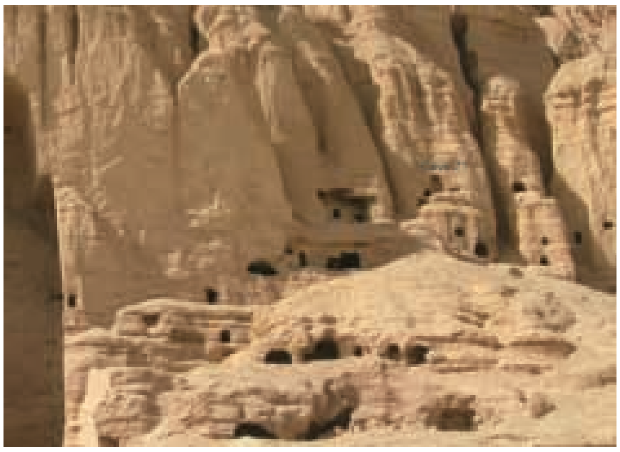


Figure 480 Cave Z1: general view.

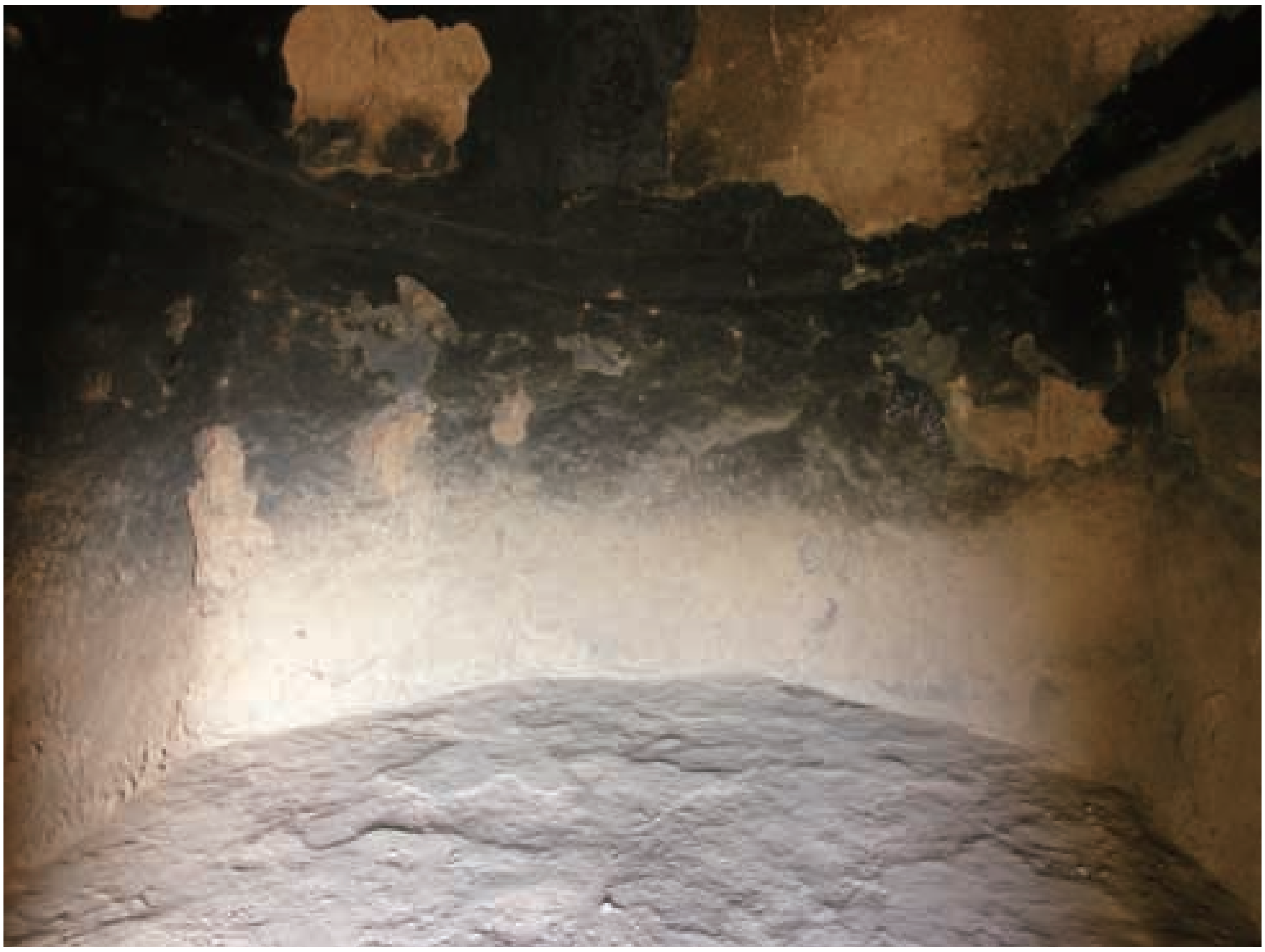


Figure 481 Cave Z1: northern side.

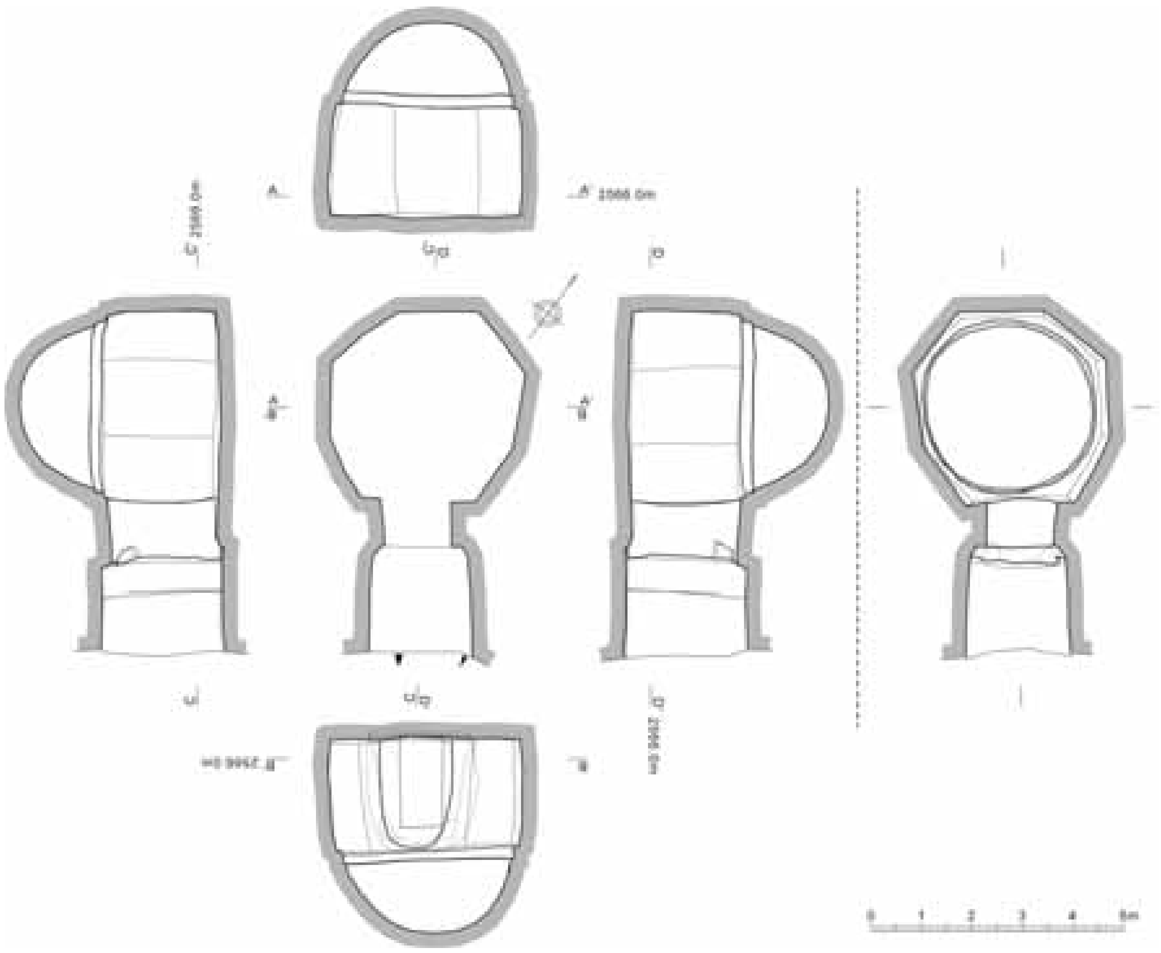


Figure 482 Cave Z1: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

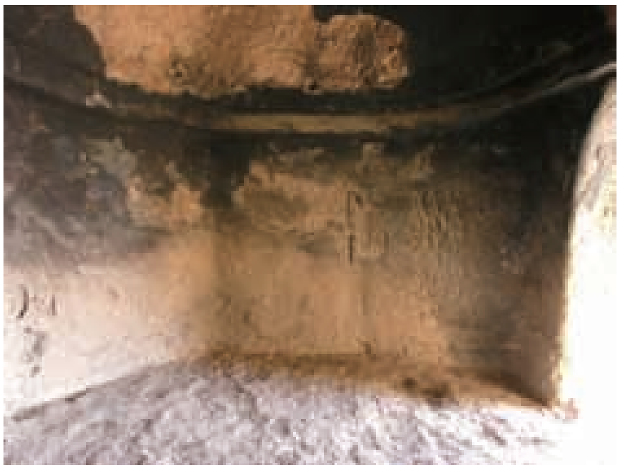


Figure 483 Cave Z1: eastern side.

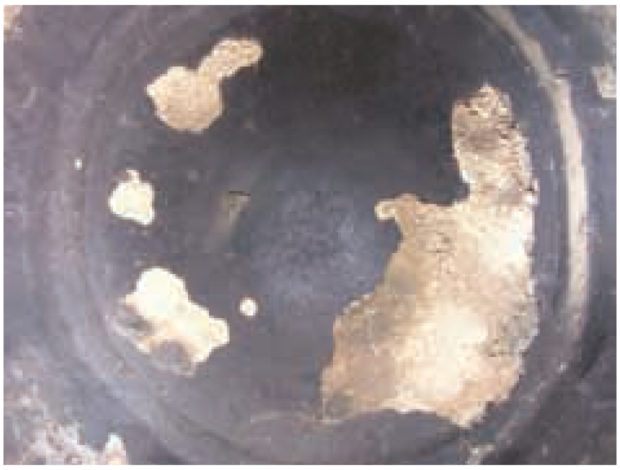


Figure 484 Cave Z1: ceiling.

Caves Z

Location: Caves Z are located on the western side, below Cave Z1 and east of the West cave-niche.

Form: Caves Z consist of Cave Z(c) with an octagonal plan and a domed ceiling, Cave Z(a) with a rectangular plan 6.5 m deep and a vaulted ceiling, and Cave Z(d) with a square plan around 2 m deep and a vaulted ceiling. There is a common forecourt, Cave Z(b), for all three caves.

Technique and design: Caves Z(c) and Z(d), which both have octagonal plans, have axes that run in different directions. Cave Z(a) has a rectangular plan with a small, simple niche, without any decorations, which is located at the end of the cave (Fig. 486). The carved remains on either side of the niche are believed to have been columns. At the entrance are traces of what might have been a doorframe. Since the entrance's interior is wider than the exterior, it is suggested that the interior space was expanded at a later stage. Cave Z(d) (Fig. 490), which is located next to Cave Z(a), has a small niche at its end and an entrance to Cave Z(a). The steps between the side walls and the domed ceiling in Cave Z(c) were described by the previous report as a hexadecagonal tambour; however, it now has a smooth surface and a circular shape (Fig. 487). Therefore its form is almost the same as that of Cave Z1, which is located in the eastern part of the Caves Z. Observed from the forecourt, the entrance to Cave Z(c) has grooves that suggest there used to be a sturdy door there (Fig. 489).

Steps are carved out above the forecourt's entrance, and there are several square holes on its northern side. They might have been used as mortises; however since they are too shallow, their function is not yet defined. Shallow curved grooves are carved out of the forecourt's ceiling, but their functions are also not defined as yet.

Present condition: The south part of the forecourt has collapsed and the interior of each cave is covered by a black sooty material. There are cracks on the eastern and western walls of Cave Z(a), and at the west corner of Cave Z(c).

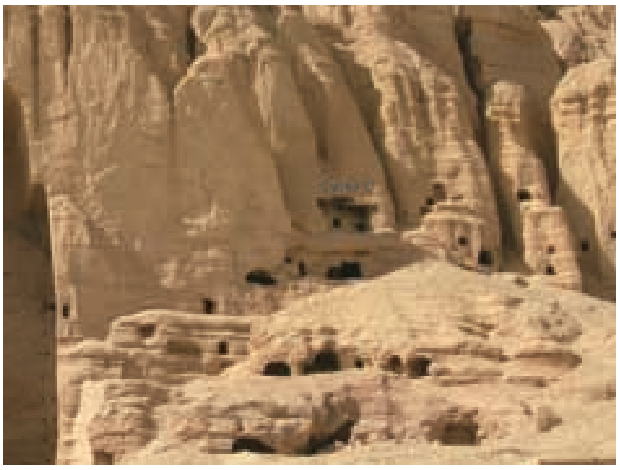


Figure 485 Caves Z: general view.

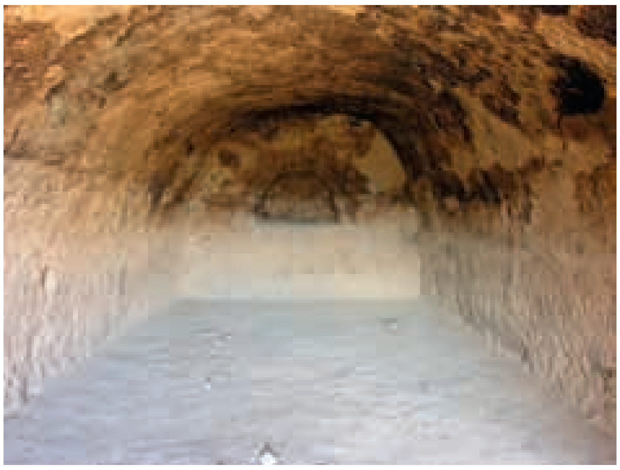


Figure 486 Cave Z(a): northern side.

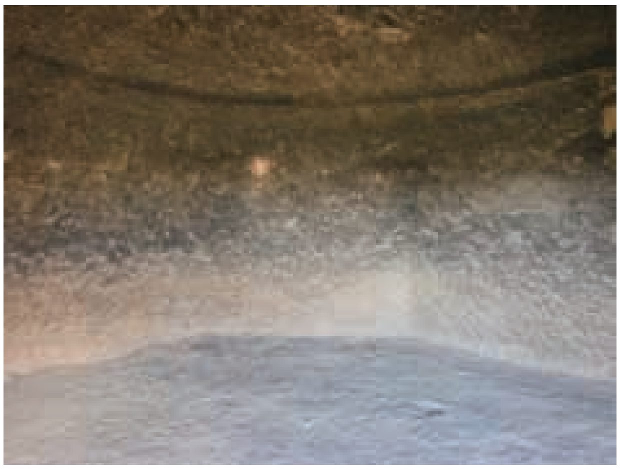


Figure 487 Cave Z(c): northwestern side.

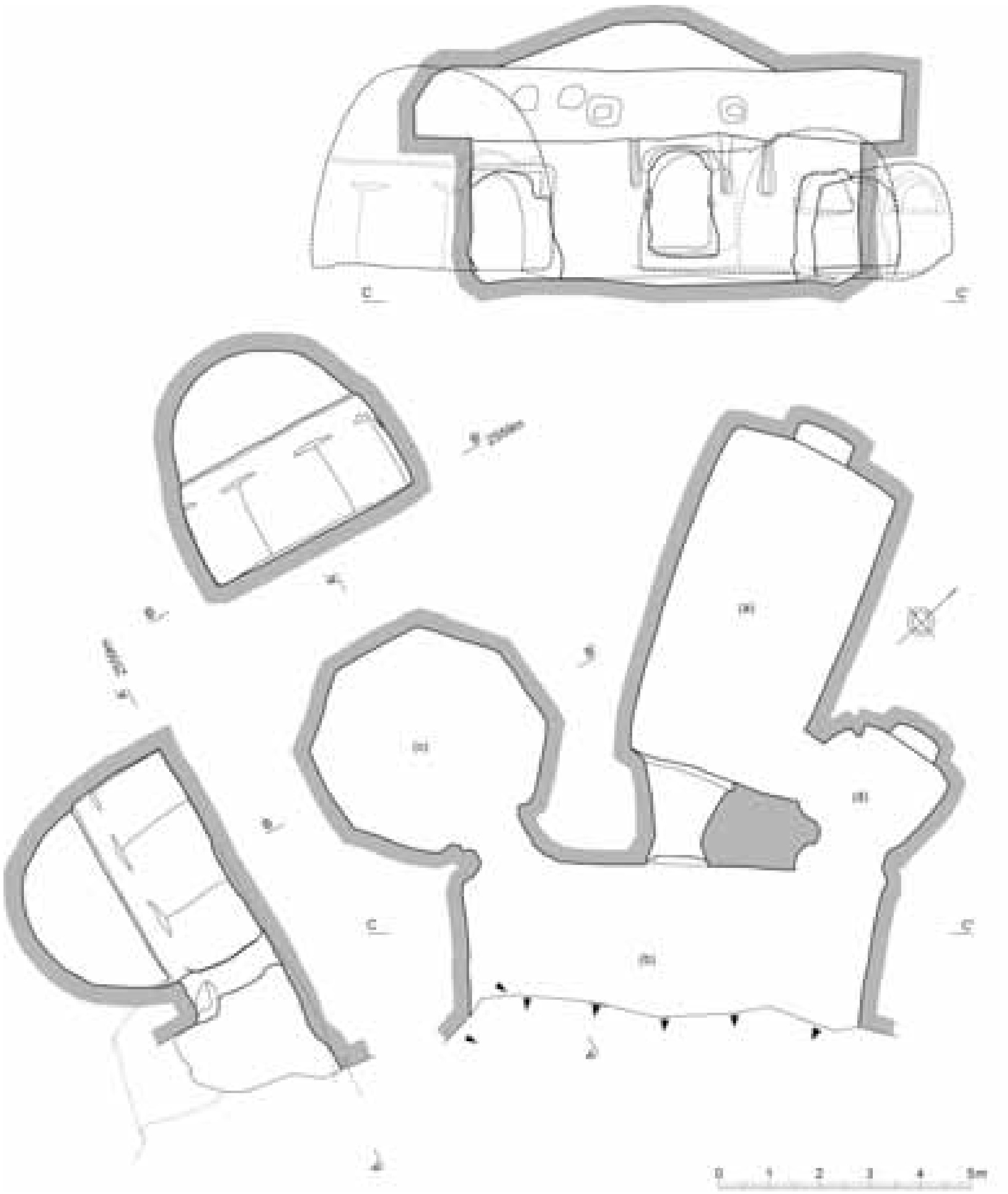


Figure 488 Caves Z: plan; section. Cave Z(c): section (measured by PASCO Corporation, Japan, in 2007).

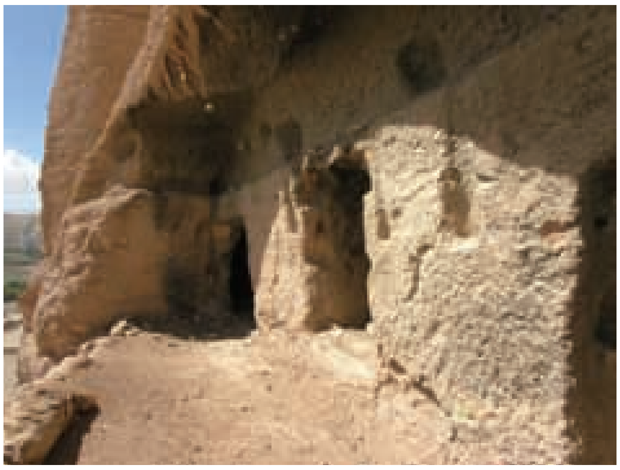


Figure 489 Cave Z(b) as a forecourt.

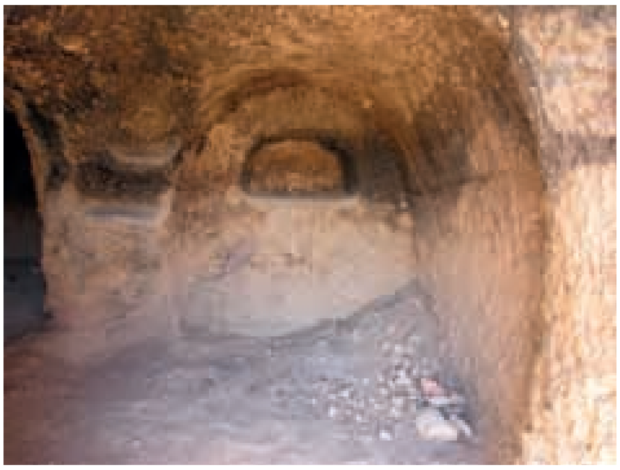


Figure 490 Cave Z(d): northern side.

Cave XI

Location: Cave XI is located just east of the West cave-niche.
Form: Octagonal plan; domed ceiling; tambour.
Technique and design: The side walls have niches, each of which has an ogee-arched frame. There are different types of regularly placed mortises inside and outside the niches. It is believed that they used to hold statues and three-dimensional decorations. The first cornice is not very deep and there are still portions of the bases whose positions correspond to the niches of the tambour. The tambour has trefoil-arched niches supported by short columns (Fig. 496). The frames of the niches are decorated, and each has an ogee arch on top, just like the niches in the side walls. Since mortises can also be found inside and outside the niches of the tambour, it is believed that statues used to be here as well. The face of the second cornice has an arabesque pattern design, which was created by modelling (Fig. 497).

There are continuous ogee arches supported by short columns at the base of the dome (Fig. 499). The arches are hemmed with modelling and have carved lattice designs between them. There are mortises and wood pieces for installing statues on the inside of each niche at the dome's base. Since hexagonal arabesque patterns are carved out at the centre of the dome, and each one has two mortises in the middle, it is assumed that they used to have three-dimensional designs (Fig. 498).

Cave XI is a cave with a rich design. Moreover, many excellent details still exist, including the modelling that covers each architectural element. This is one of the caves that must be preserved for the future.
Present condition: The side walls are finished with wall clay, but lower on the wall more clay has peeled off revealing the solid rock. The inside of the cave is covered by a black sooty material. No cracks were observed inside the cave, but one part of the rock, located just above the entrance, has fallen and its pieces are scattered near the entrance (Fig. 500).

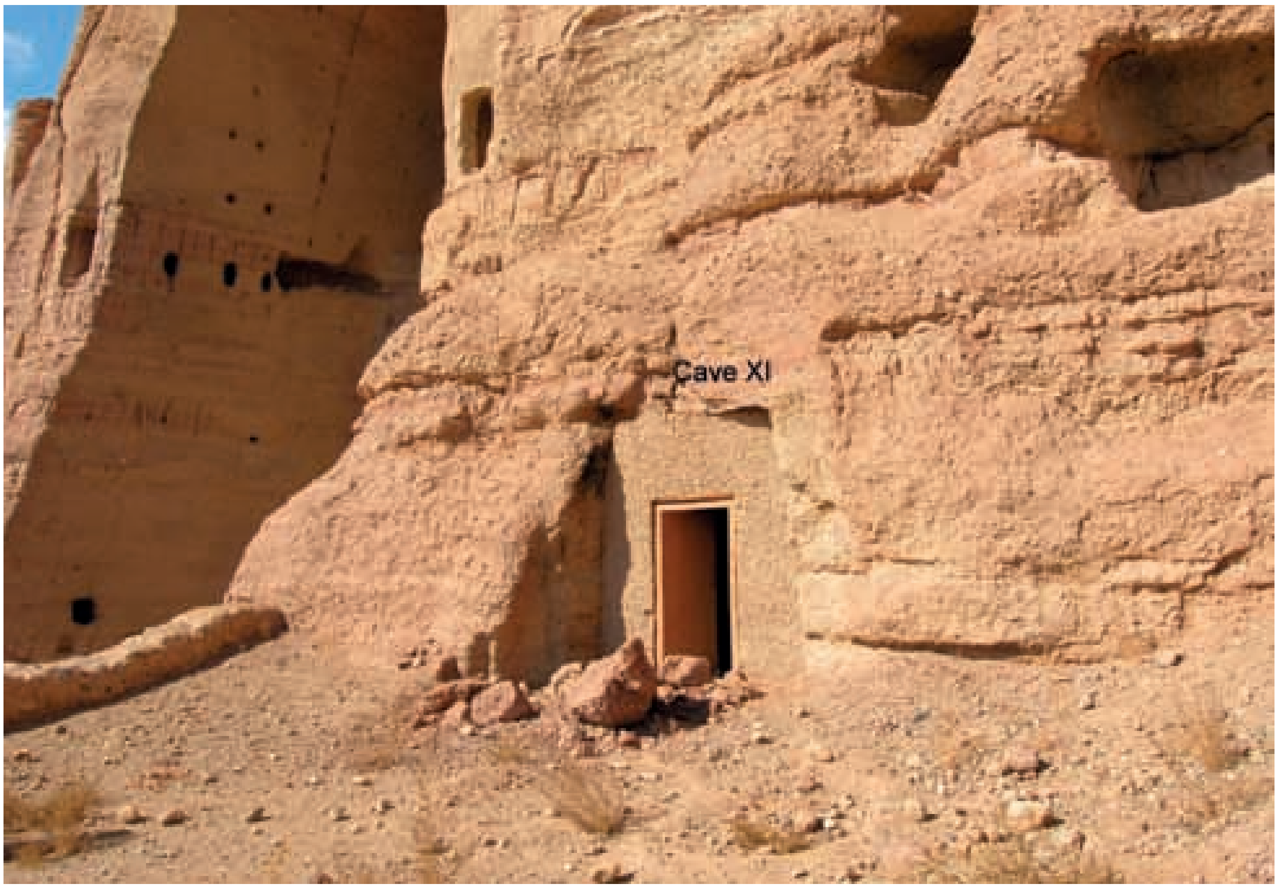


Figure 491 Cave XI: general view.

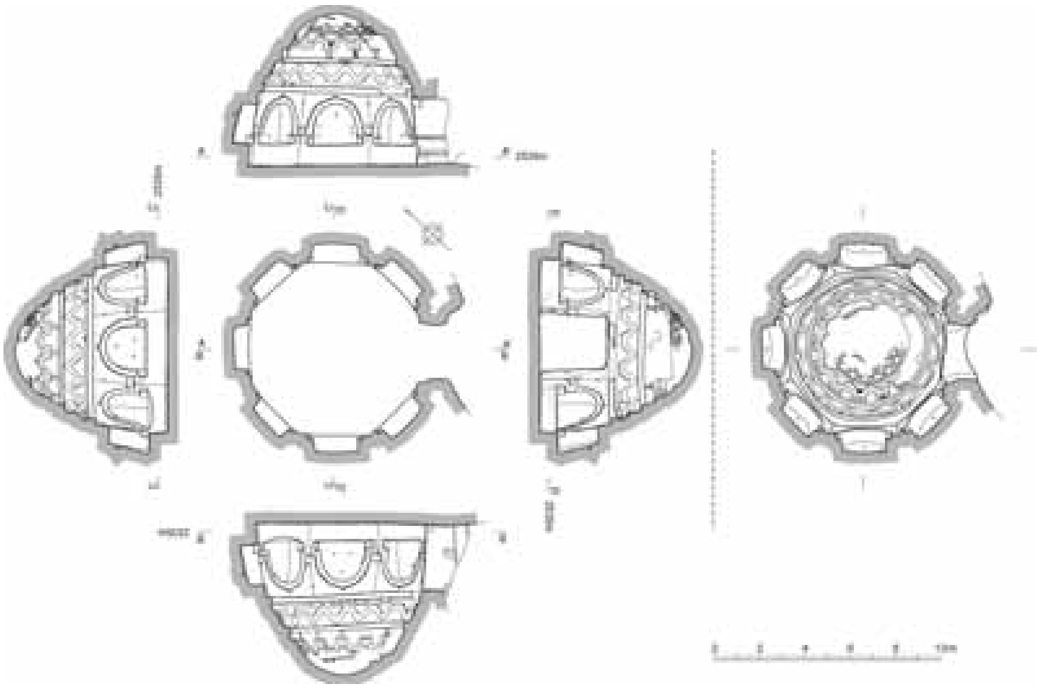


Figure 492 Cave XI: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

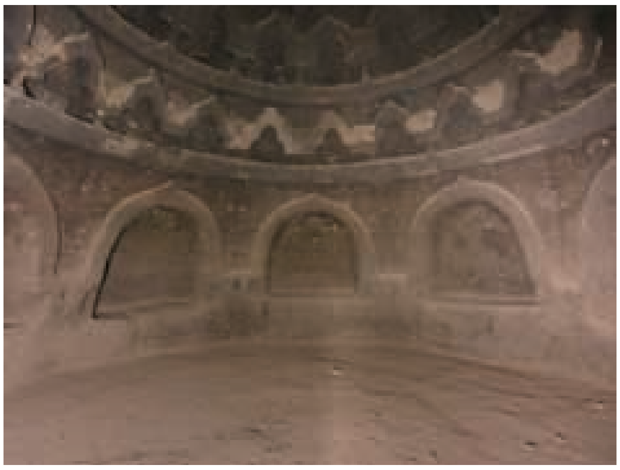


Figure 493 Cave XI: northern side.

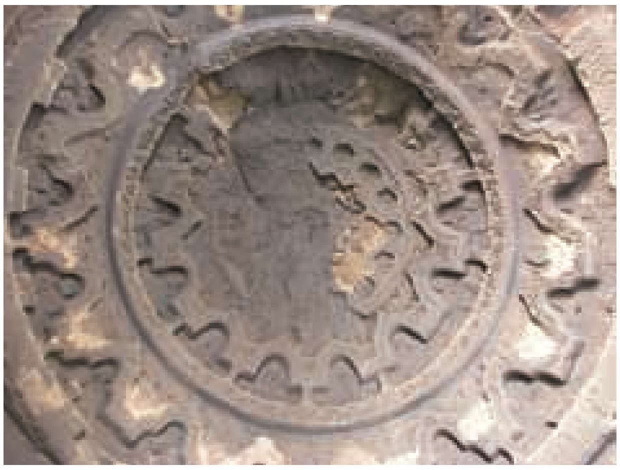


Figure 495 Cave XI: ceiling.

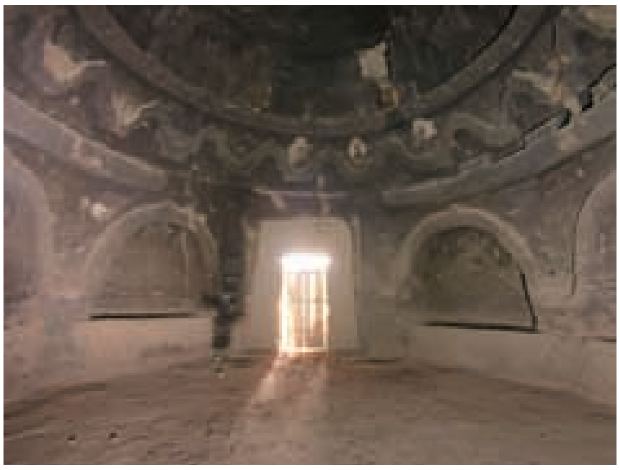


Figure 494 Cave XI: southern side.

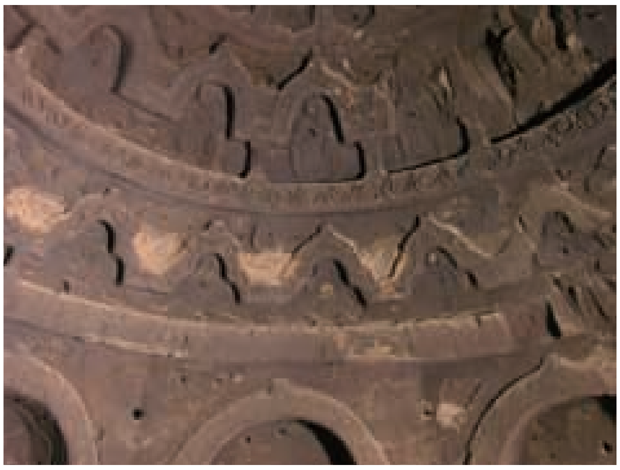


Figure 496 Cave XI: tambour.

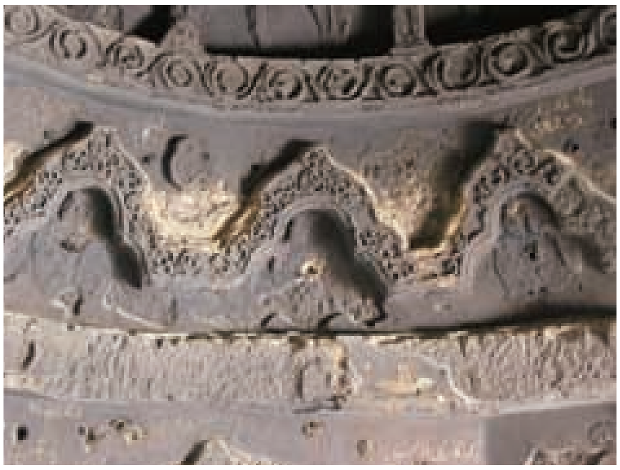


Figure 497 Cave XI: three-dimensional designs at the tambour.

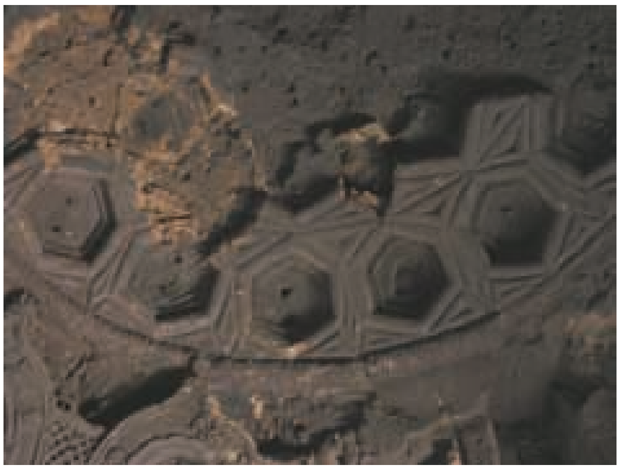


Figure 498 Cave XI: hexagonal design at the ceiling.

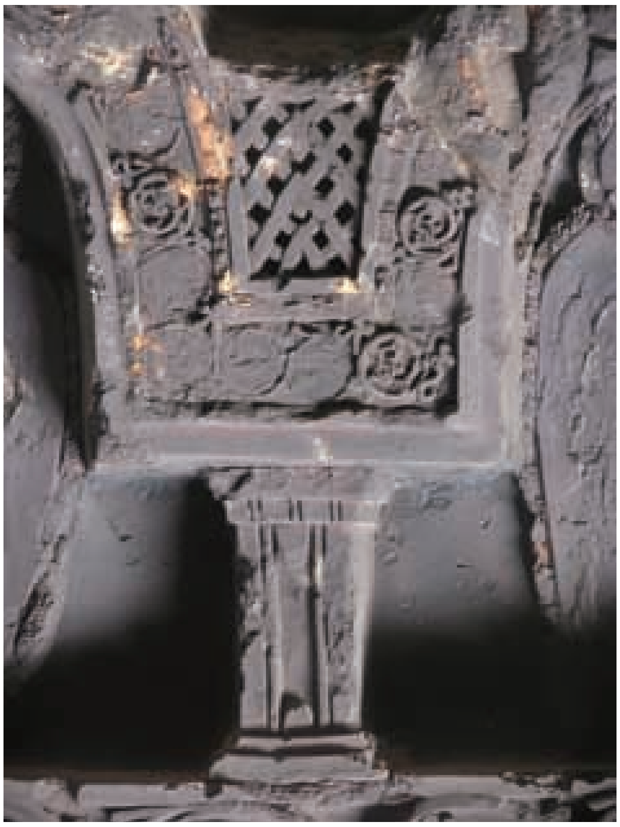


Figure 499 Cave XI: design of short columns.

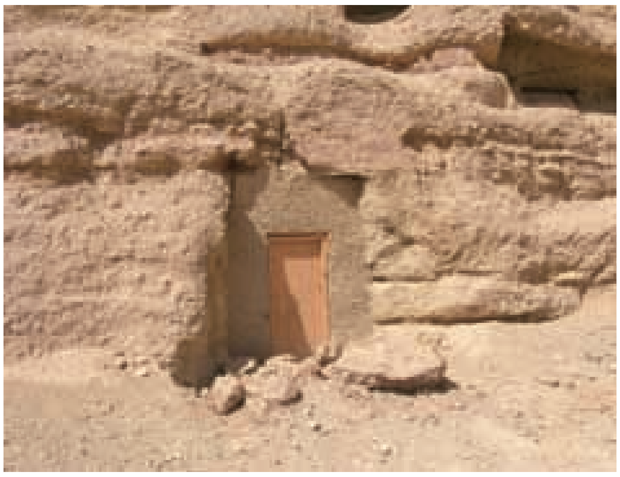


Figure 500 Cave XI: entrance.

The West cave-niche

Location: The West cave-niche is located on the western side of the Great Cliff of Bamiyan.

Form: The cave-niche is about 55 m high, 24 m wide at its widest point near the feet, and about 30 m deep. Nine caves are carved out near the Buddha's feet at the bottom of the cave-niche. There is a staircase at Cave 53-VIII that leads up and to the south, but it is unfinished and stops before it reaches the top. It is believed that there was a plan to create a passage around the niche and inside the solid rock, similar to that in the East cave-niche, however the plan was abandoned halfway through the passage's construction. There is a passage, which is assumed to be a pilgrimage route, near the head of the Buddha, and this passage provides a view down the inside of the cave-niche. The entrance to this passage is located on the western side of the cliff at the height of the Buddha's head. It is not clear if this entrance is original as there is no access observed from inside the cave-niche.

Technique and design: The caves, which are located near the Buddha's feet, have centred plans and different designs. Two caves, situated behind the cave-niche, have octagonal plans; two caves, found at the eastern side and in front of the cave-niche, have square plans; two caves, which are situated at the western side and in the front, have an octagonal or circular plan; finally, the northwest cave has a square plan. The locations of the caves are almost the same as those found around the East cave-niche. However, the West cave-niche is bigger and has richer three-dimensional designs than the East cave-niche.

On the east and west floors of the passage, which is located inside the solid rock at the Buddha's head, there are grooves thought to have been used to install wooden beams extending towards the interior of the cave-niche. The western side has a row of six grooves, and the eastern side has a row of seven. At the ends of these grooves is a wall that contains mortises for receiving the ends of the timbers (Figs 507, 508). These grooves are believed to be remnants of wooden constructions that supported a cantilever terrace, like that in the East cave-niche. However, the size of the construction in the West cave-niche is larger than that in the east.

Present condition: When the West Buddha was destroyed by the explosion in 2001, the niches around the feet of the Buddha were also seriously damaged. When the research was carried out in 2006, pieces of the Buddha were scattered on the floor of the cave-niche. Now, the pieces are being gathered as part of a conservation campaign by UNESCO (Fig. 506). Because a considerable number of pieces were also on the floor of the caves around the feet of the Buddha, only a few caves could be researched. When the explosion occurred, the wall paintings, which remained at the upper part of the cave-niche, were further destroyed. A few wall paintings, which had survived in the nearby caves, were also lost. Many cracks have been observed, but their detailed study remains a future task.

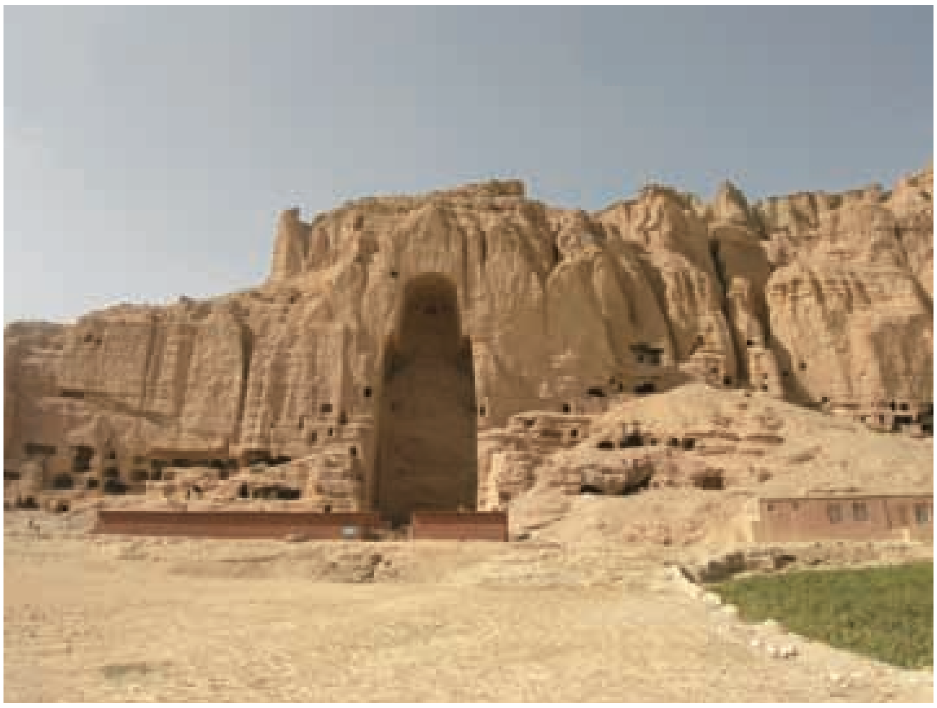


Figure 501 West cave-niche: general view.

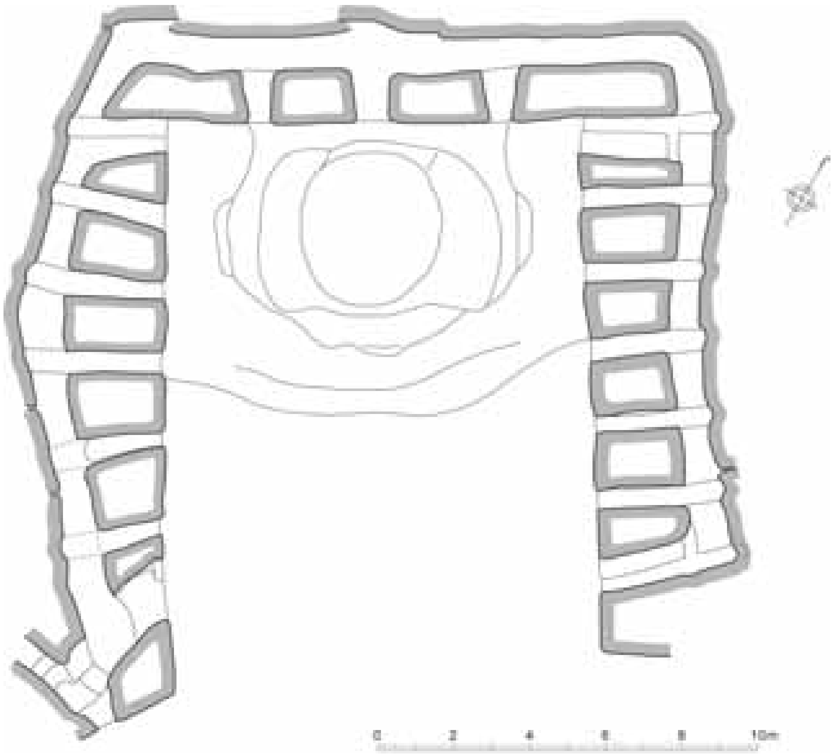


Figure 502 West cave-niche: plan at the level of the Buddha's head (after Kodera *et al*. 1971).

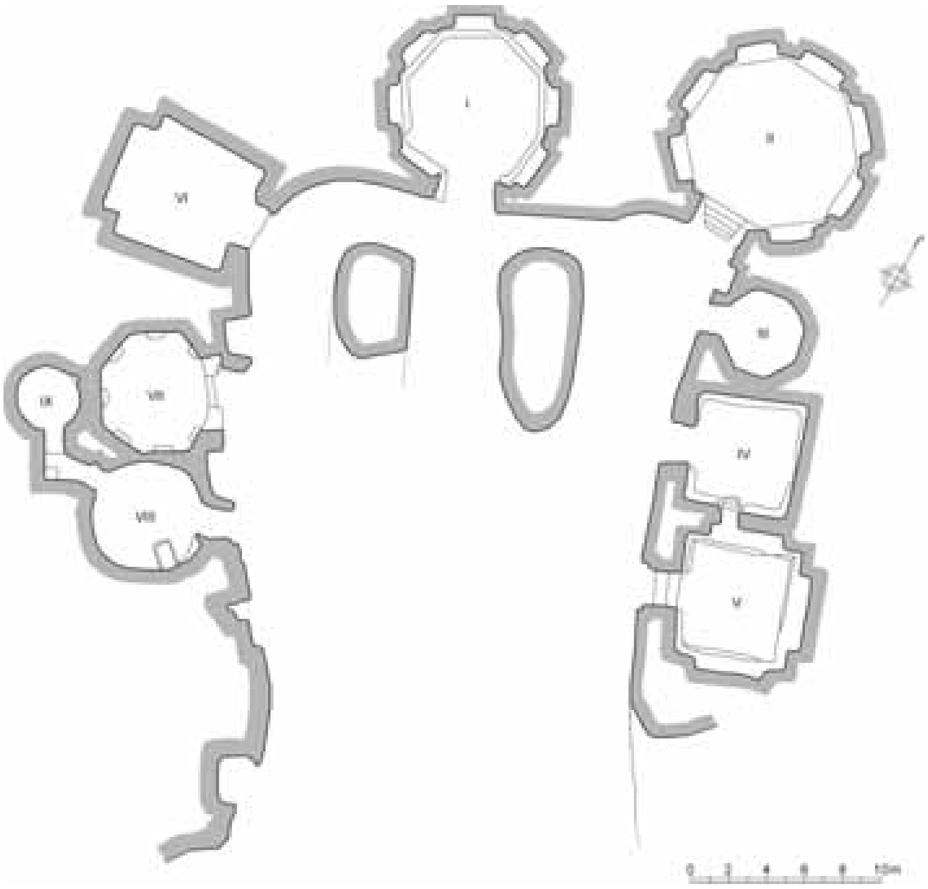


Figure 503 West cave-niche: plan at the level of the Buddha's feet (after Kodera *et al*. 1971).

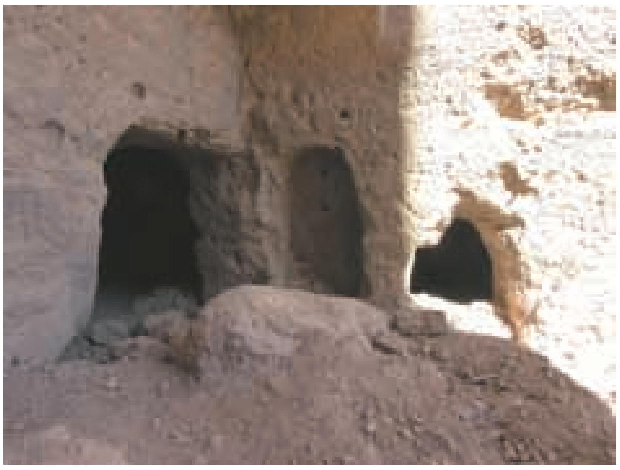


Figure 504 West cave-niche: eastern side of the feet.

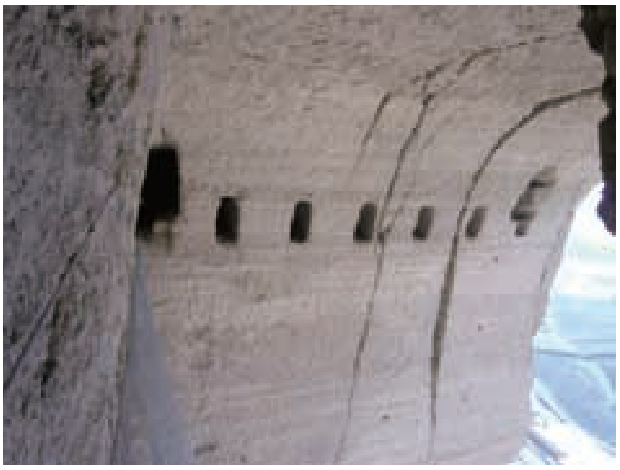


Figure 507 West cave-niche: eastern side upper part.

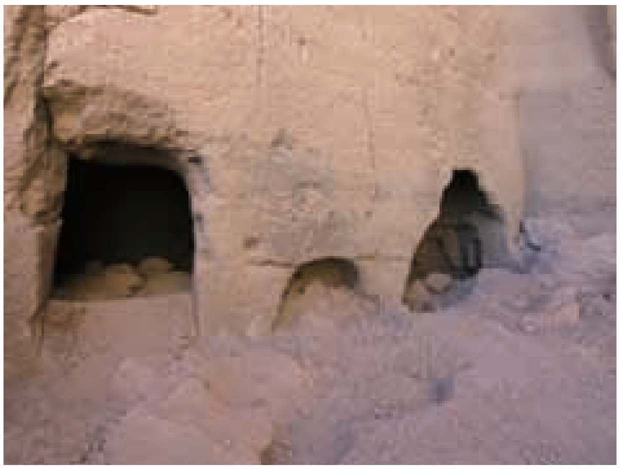


Figure 505 West cave-niche: western side of the feet.

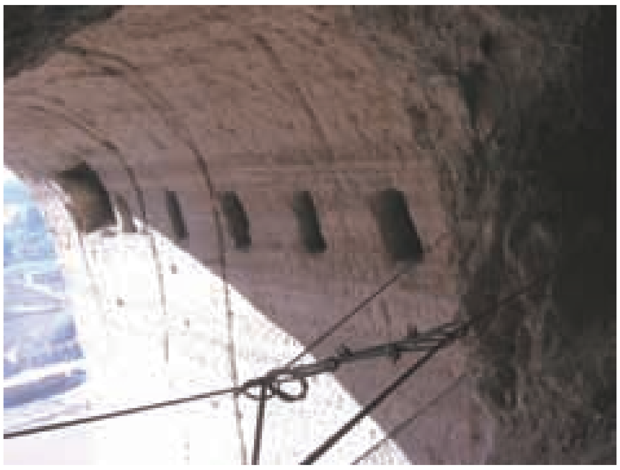


Figure 508 West cave-niche: western side upper part.

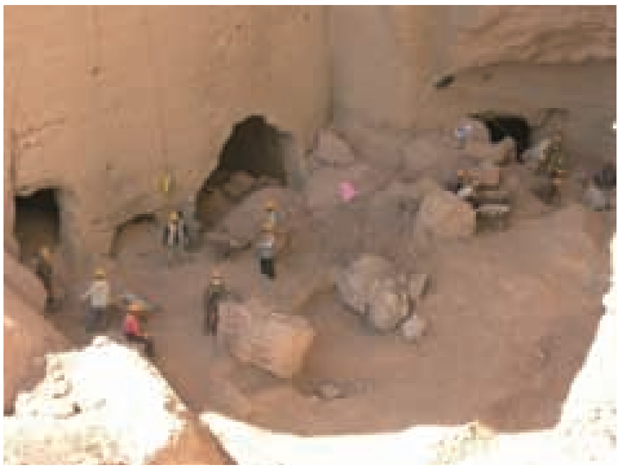


Figure 506 West cave-niche: view of workers removing the pieces.

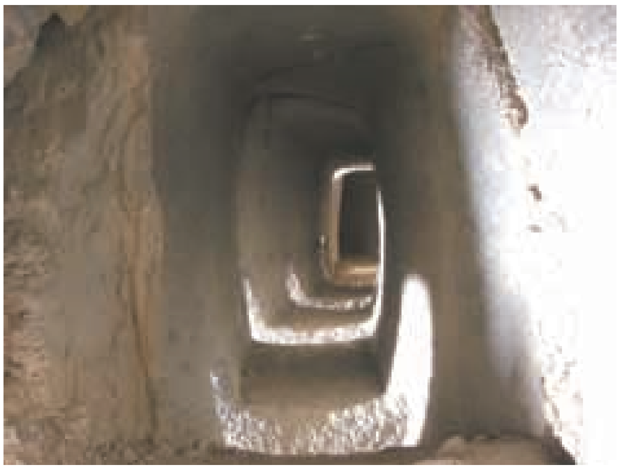


Figure 509 West cave-niche: pilgrimage route near the Buddha's head.

Cave 53-II

Location: Cave 53-II is located at the northeastern corner of the Buddha's feet.
Form: Octagonal plan; domed ceiling. The transitional section has a tambour with carved trefoil arches and a cornice.
Technique and design: There are remains of regularly aligned mortises on the side walls, tambour and ceiling. Ogee-arched frames and short columns, which support the arches, are carved out of the niches in the side walls. Above the tambour with carved trefoil arches is another row consisting of ogee-arched niches. This row of niches at one time clearly had very rich decorations.
Present condition: The surface most probably had three-dimensional designs made from clay, however there are no remains of these. Cracks are observed on the ceiling and the side walls.

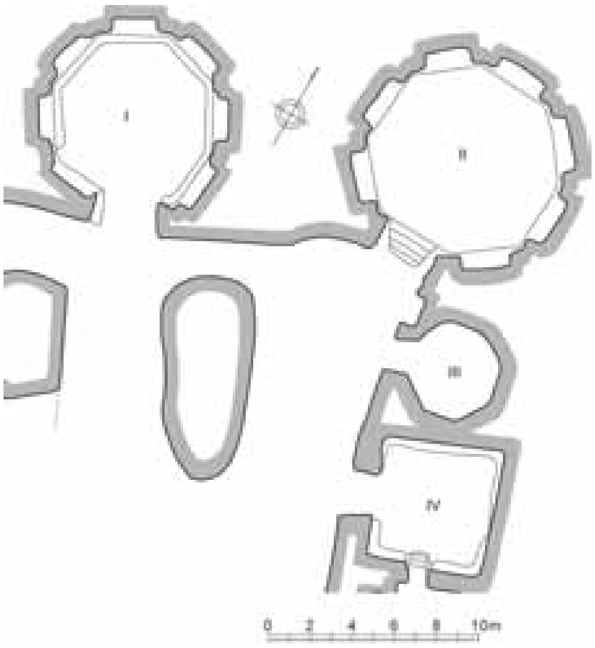


Figure 510 Cave 53-II: pilgrimage route near the Buddha's head (after Kodera *et al.* 1971).

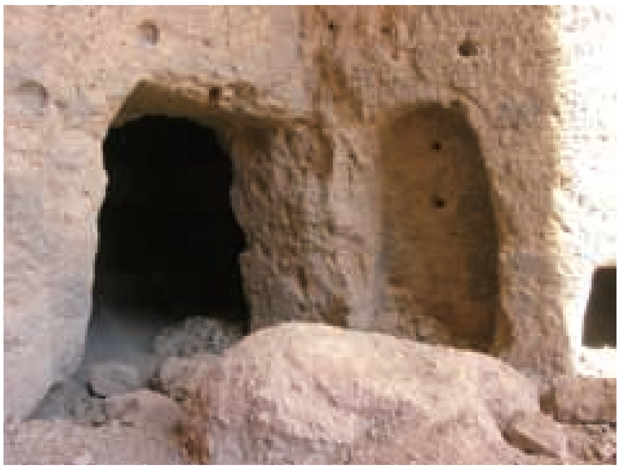


Figure 511 Cave 53-II: general view.

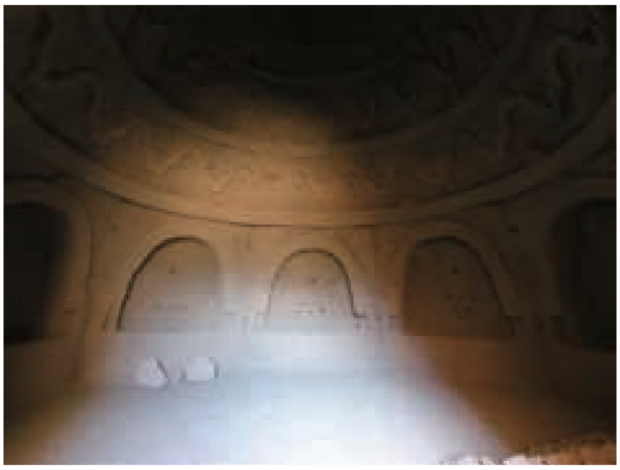


Figure 512 Cave 53-II: northern side.

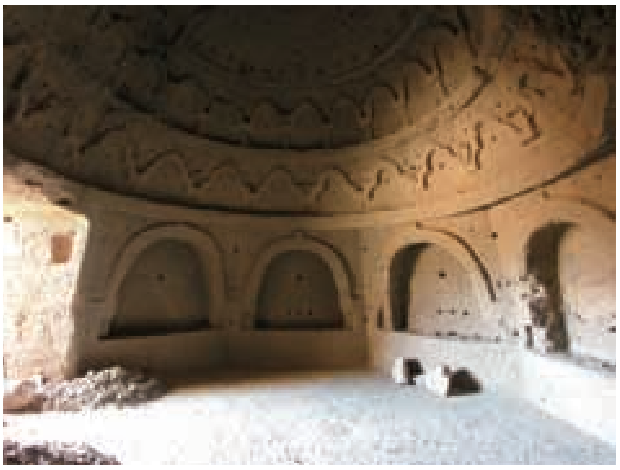


Figure 513 Cave 53-II: western side.

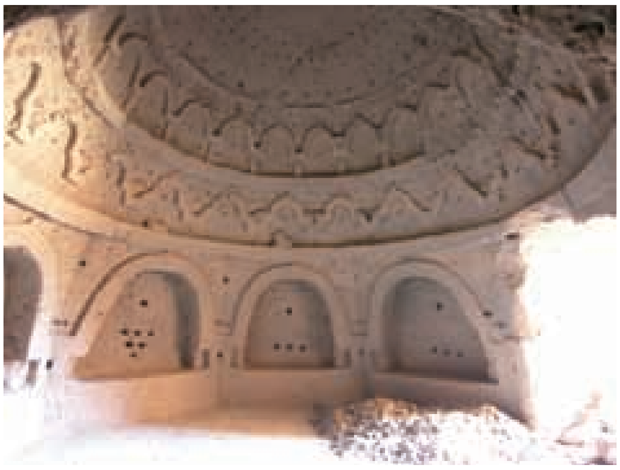


Figure 514 Cave 53-II: eastern side.

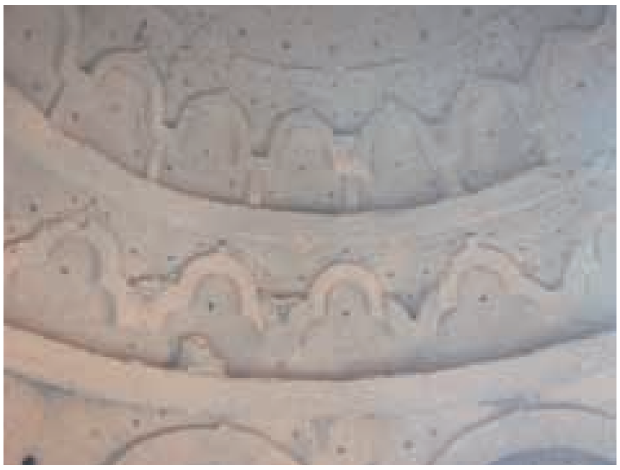


Figure 516 Cave 53-II: tambour.

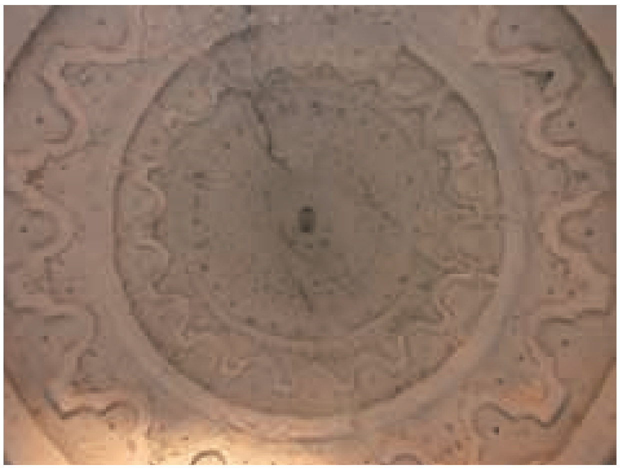


Figure 515 Cave 53-II: ceiling.

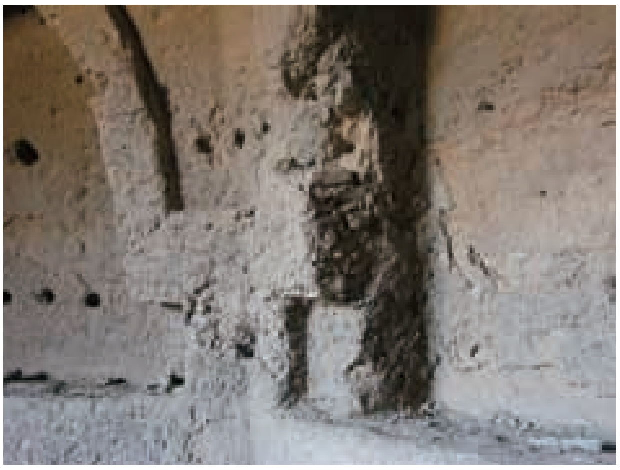


Figure 517 Cave 53-II: conservation remains on the northern side of the niche.

Cave 53-III

Location: Cave 53-III is located on the western side of the Buddha and is the third cave from the cliff surface.
Form: Octagonal plan; domed ceiling. A polygonal tambour and cornice are carved out at the transitional piece. There are mortises positioned in a concentric circle in the ceiling.
Present condition: There are partial wall clay remains on the walls inside the cave. Some pieces of the destroyed Buddha sculpture remain inside the cave.

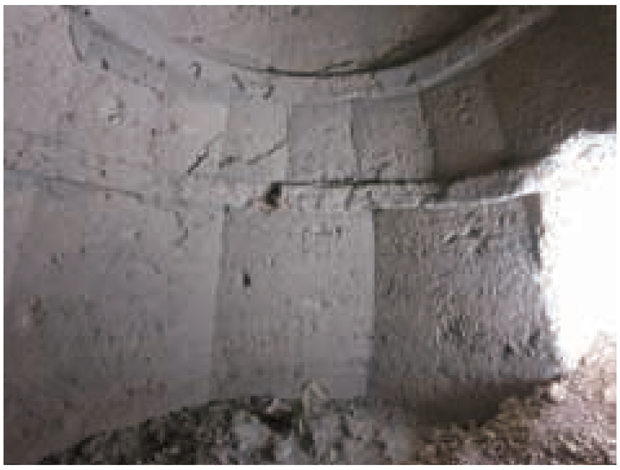


Figure 520 Cave 53-III: southern side.

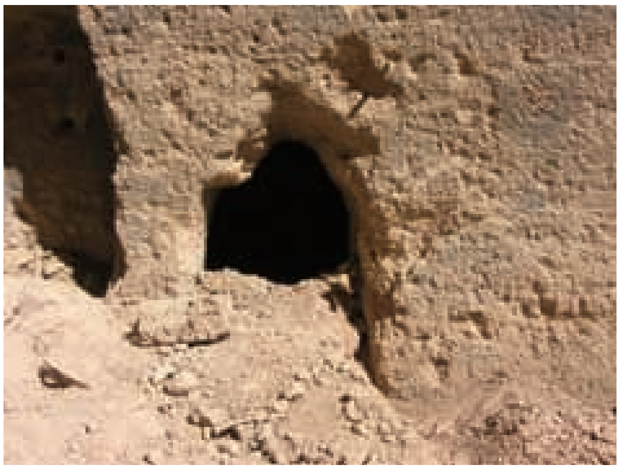


Figure 518 Cave 53-III: general view.

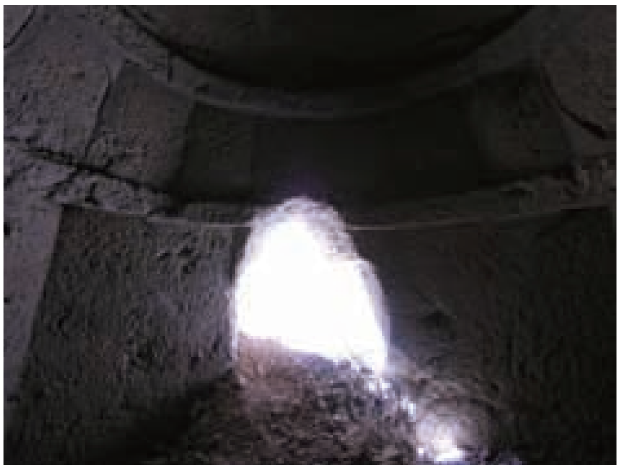


Figure 521 Cave 53-III: western side.

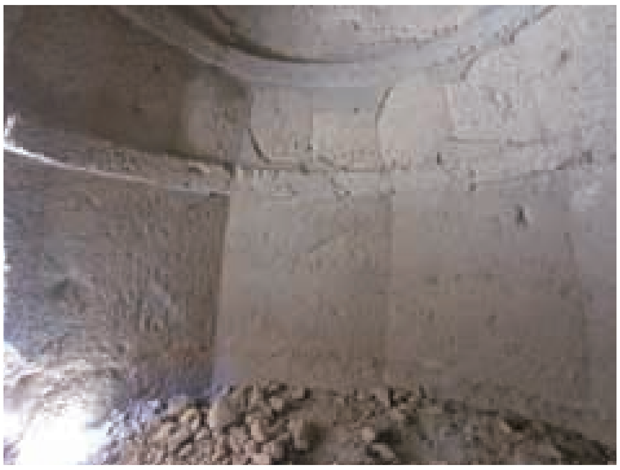


Figure 519 Cave 53-III: northern side.

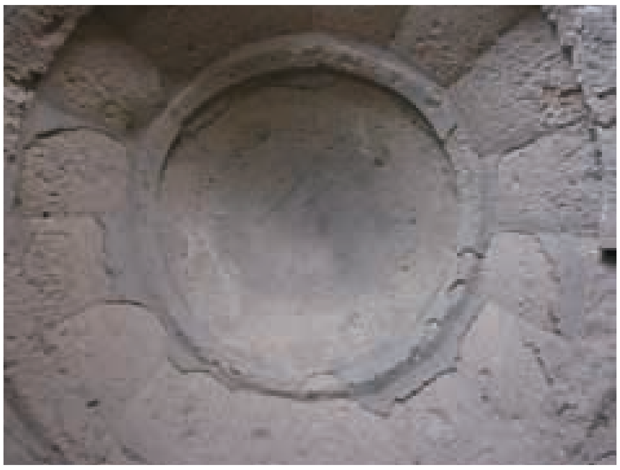


Figure 522 Cave 53-III: ceiling.

Cave 53-IV

Location: Cave 53-IV is located on the eastern side of the Buddha's feet, and is the second cave from the cliff surface.
Form: Square plan; domed ceiling; tambour; cornices. The domed ceiling has a circular cornice and an octagonal tambour. The side walls and the tambour are inclined inwards. Because the cornice has a circular shape, there are pendentives at the corners of the side walls.
Technique and design: The surfaces of the walls, tambour and cornice have regularly aligned mortises of different sizes. In total, there are 10 mortises on the side wall in two horizontal rows; each row has five rather large holes. Each side of the octagonal tambour also has mortises, which are placed regularly. These large mortises on the side walls and the tambour are believed to have been used to hold wooden pieces to support statues. On the other hand, because of their shape and regular positions, the smaller mortises on the tambour are thought to have been used to hold wooden pieces to fix the short columns and frames made from clay. A wall clay layer made with Susa was found on the walls, with a finishing layer on top. Cave 53-IV appears to have had solemn decorations composed of different colours.

The walls might have had at least five statues, and the niches in the sides of the octagonal tambour are also assumed to have held statues. Moreover, it is believed that the cave featured colours that made the space sacred. Considering these facts, the original design of the cave was more decorative and would have created a different impression than the cave in its current condition.
Present condition: Most of the wall clay and three-dimensional decorations were created by modelling, and did partially survive on the walls and the cornice before being destroyed by the explosion. Removal of a mass of rock is being carried out, and the opening made on the southern wall of the cave, next to Cave 53-V, has been closed up with bricks.

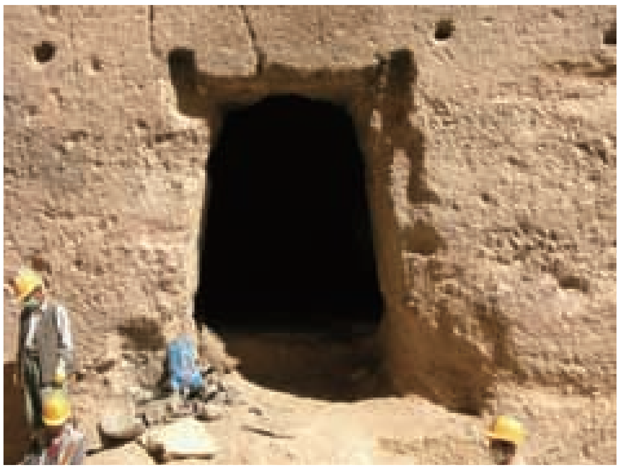


Figure 523 Cave 53-IV: general view.

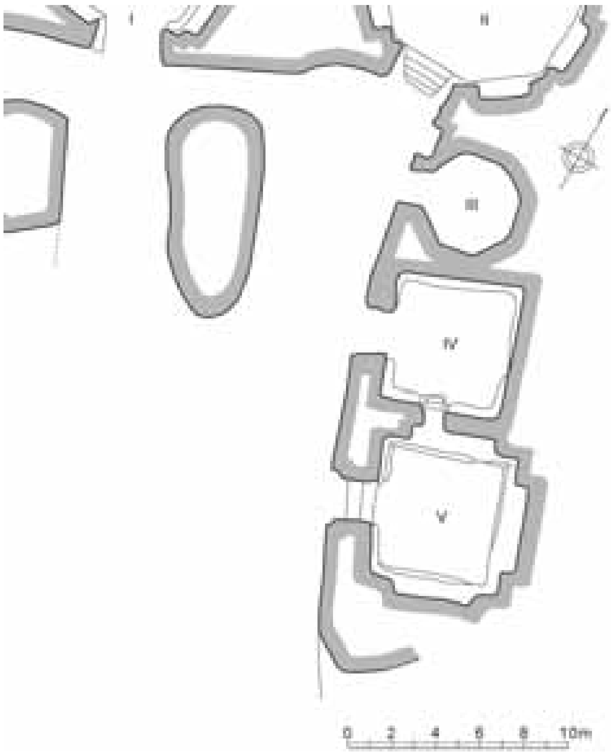


Figure 524 Cave 53-IV: plan (after Kodera *et al*. 1971).

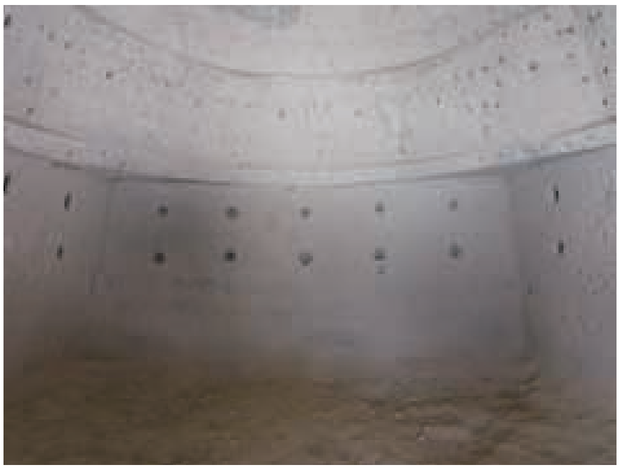


Figure 525 Cave 53-IV: eastern side.

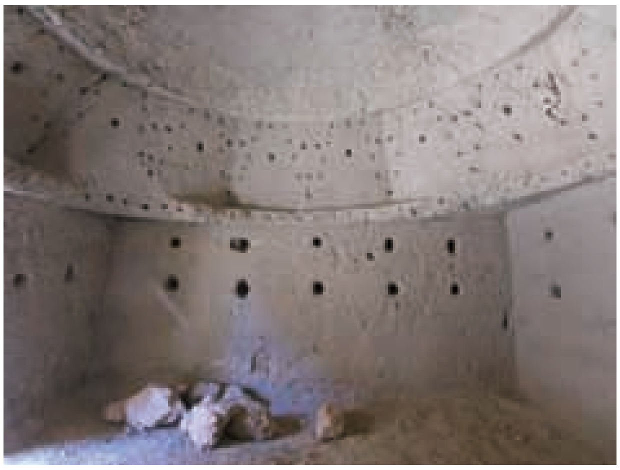


Figure 526 Cave 53-IV: northern side.

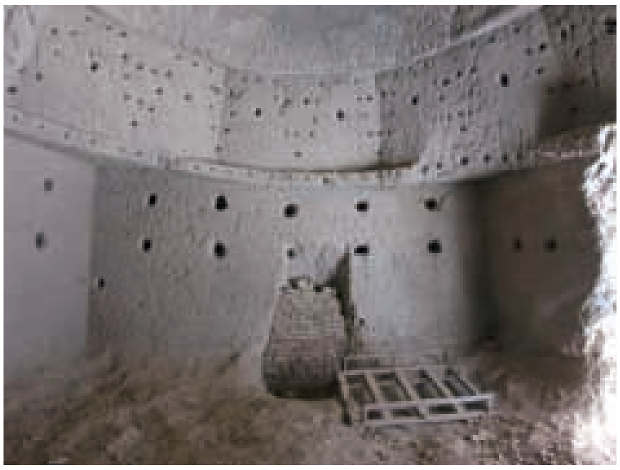


Figure 527 Cave 53-IV: southern side.

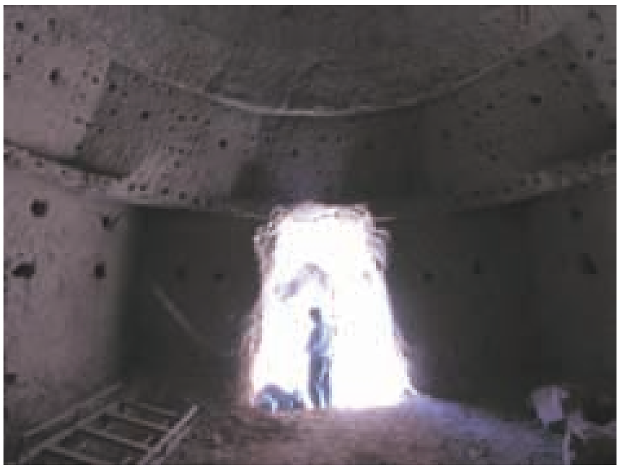


Figure 528 Cave 53-IV: western side.

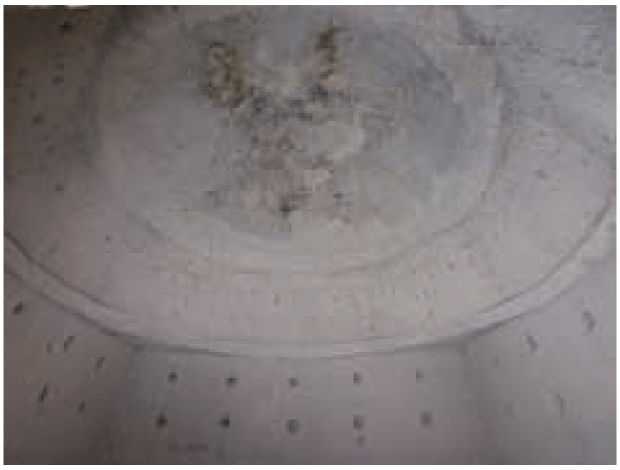


Figure 529 Cave 53-IV: ceiling.

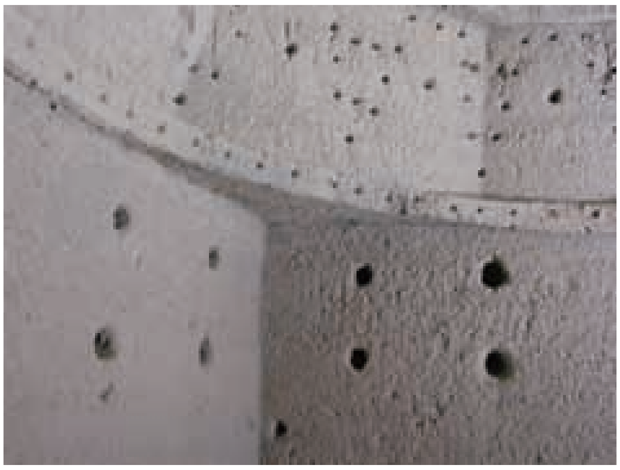


Figure 530 Cave 53-IV: corners.

Cave 53-V

Location: Cave 53-V is located on the eastern side of the Buddha's feet, and is the cave closest to the cliff surface.

Form: Square plan; *laternen-decke*; tambour; cornices. The side walls are inclined inwards. Above the side walls, a cornice, square-shaped tambour and *laternen-decke* are carved out. Except for the side wall that contains the entrance, there is a large trefoil niche in each wall and a bench-like base runs around the entire cave.

Technique and design: Most of the wall clay finishes on the side walls have been lost therefore the original design is unknown. The side walls have regularly placed mortises. The niche in the eastern wall, which is across from the entrance, has evenly carved mortises on its frame (Fig. 535). These are believed to have been used for pieces of wood that supported mouldings. However, the mortises inside the niche are thought to have been used for pieces of wood that supported statues. The original arabesque patterns survive on one part of the cornice and some colours also remain (Fig. 540). No mortises are observed on the cornice therefore it seems that the wall clay was first added on top of the solid rock, then the upper ledge of the cornice and the arabesque patterns on the face of the cornice were done by modelling, and finally, colours were painted on the surface.

Each side of the tambour has four trefoil arches, which are connected to each other (Fig. 539). Between the arches are short columns that were created by modelling. The tops of the arches have three-dimensional mouldings also done by modelling. The frames of the arches on the tambour differ from those on the side walls, as these are carved out of the solid rock. Inside the arches are three mortises that form an isosceles triangle on the rock. The top mortise still has a piece of wood, but the lower two mortises do not have wood and they are smaller than the top mortise. They are believed to have been used to support statues. The *laternen-decke* has rather elaborate details.

On top of the ceiling beams there are two additional layers of beams. Between these beams and the ceiling, frames have been created by modelling. The wall clay survives in good condition, with a layer of colour, even though the colours are partially changed and some damage can be observed. From these observations, we can conclude that the cave had a bench-like base running along the walls, and each side wall had a large niche in the middle where statues used to be fixed. The arches on the tambour also used to contain statues. The side walls, cornice, tambour and the entire ceiling have a base coating layer of wall clay. With the exception of the the ceiling, the entire cave had decorations created by modelling. Moreover, in order to increase its solemnity, the entire cave had been painted. The cave has a large interior height relative to the size of its plan, which draws immediate attention to the *laternen-decke* and the high tambour with arches.

Present condition: There are vertical cracks at the west corners on both the southern and northern sides. As they run parallel to the eastern wall of the cave-niche they might be part of a structural crack in the solid rock. Several cracks were observed on the beams near the ceiling, but they are not related to the cracks described previously.

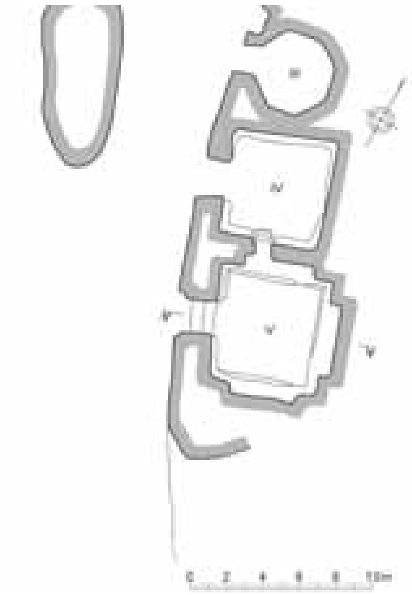


Figure 531 Cave 53-V: plan (after Kodera *et al.* 1971).

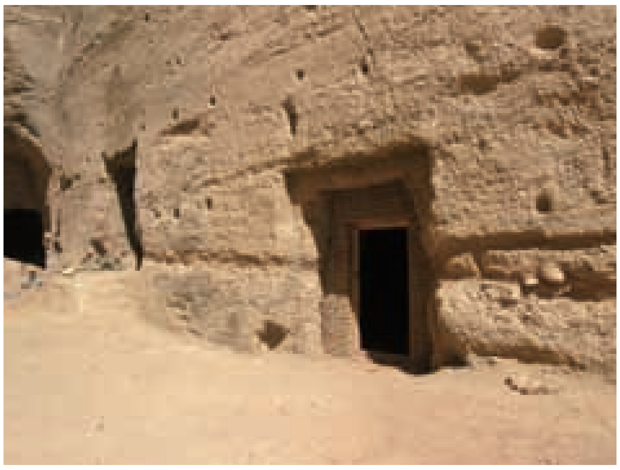


Figure 532 Cave 53-V: general view.

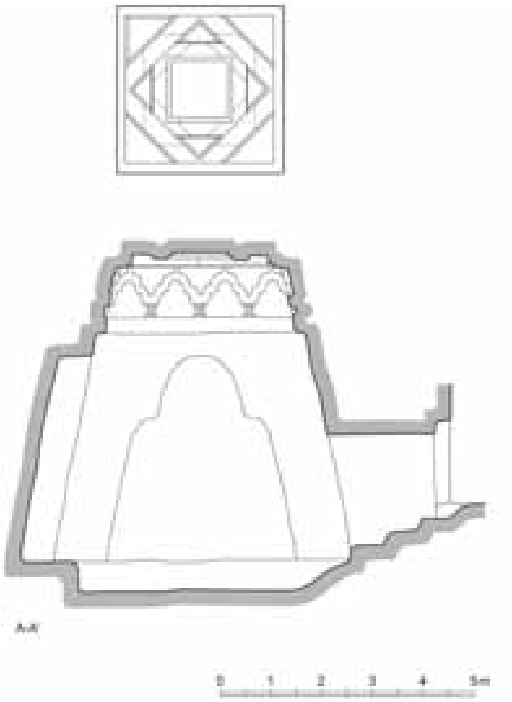


Figure 533 Cave 53-V: section; ceiling (after Kodera *et al.* 1971).

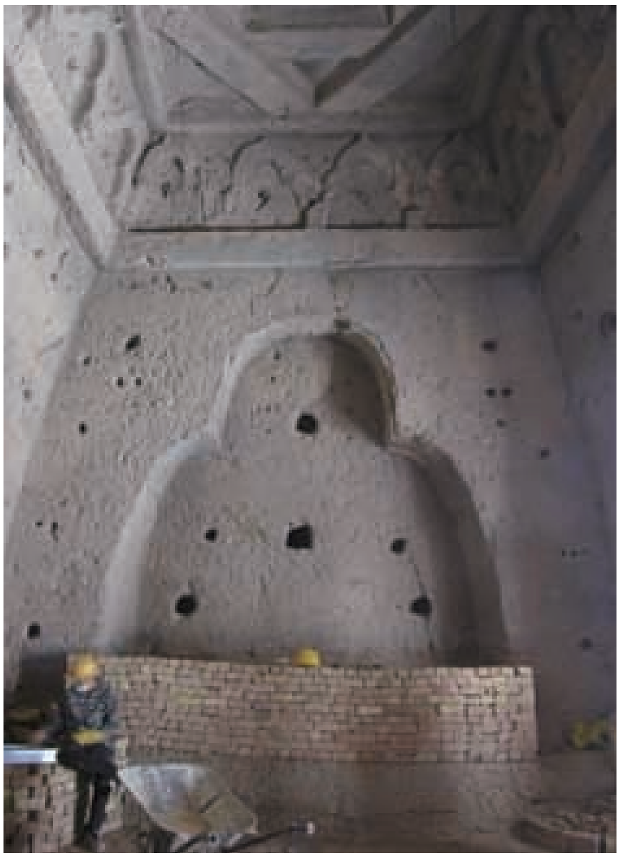


Figure 534 Cave 53-V: southern side.

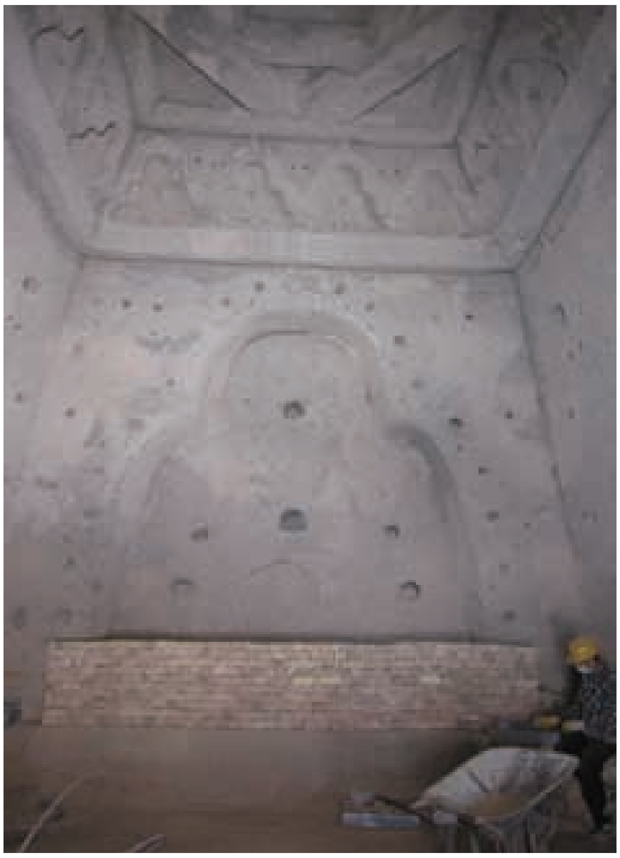


Figure 535 Cave 53-V: eastern side.

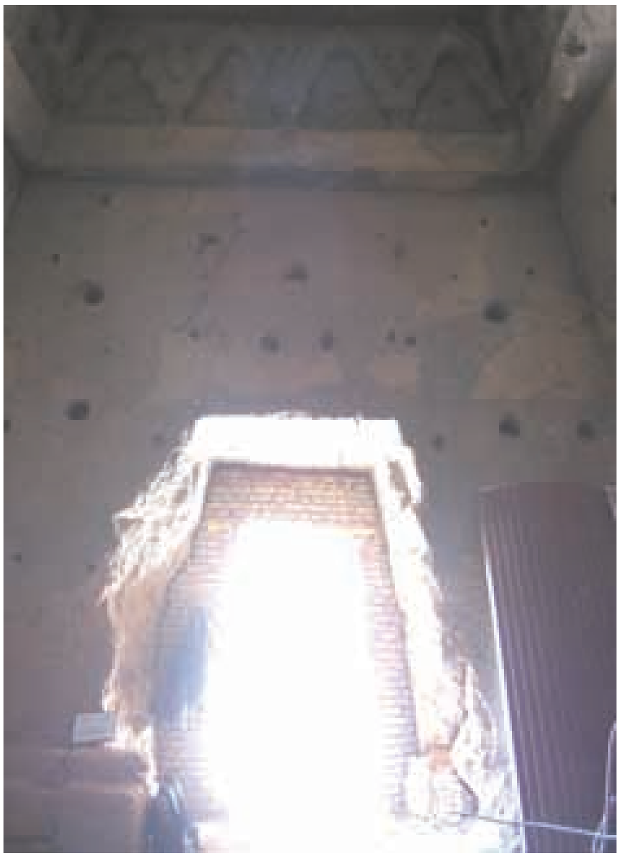


Figure 536 Cave 53-V: western side.

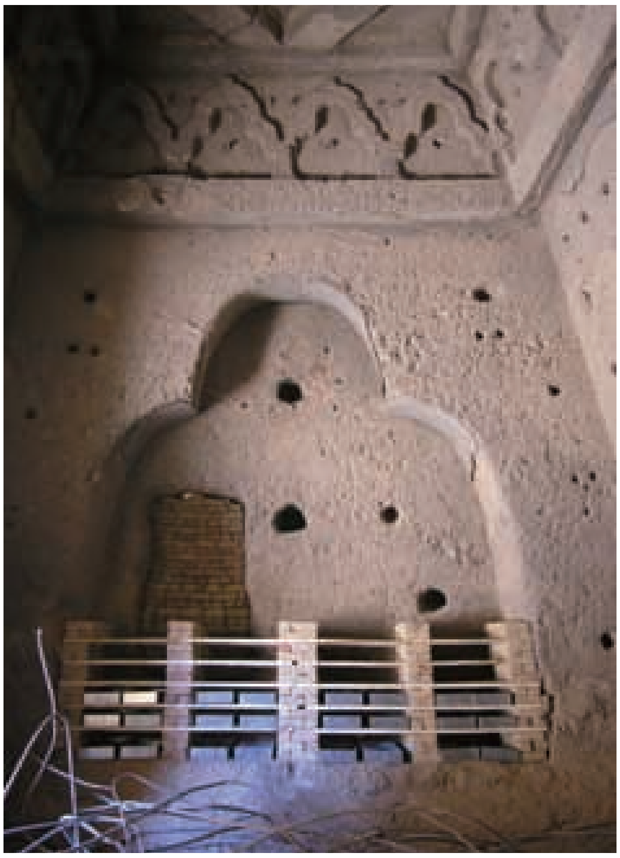


Figure 537 Cave 53-V: northern side.

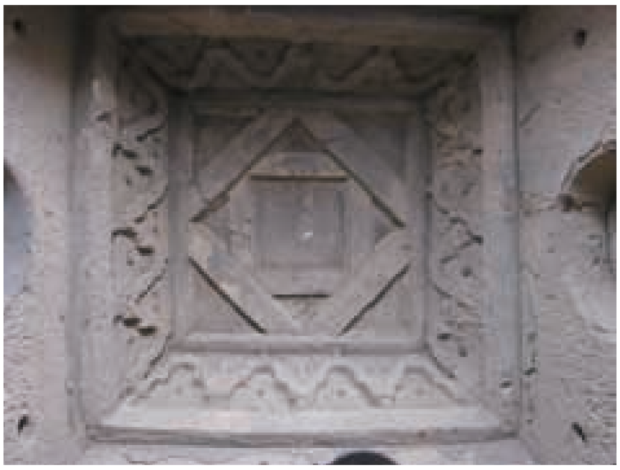


Figure 538 Cave 53-V: ceiling.

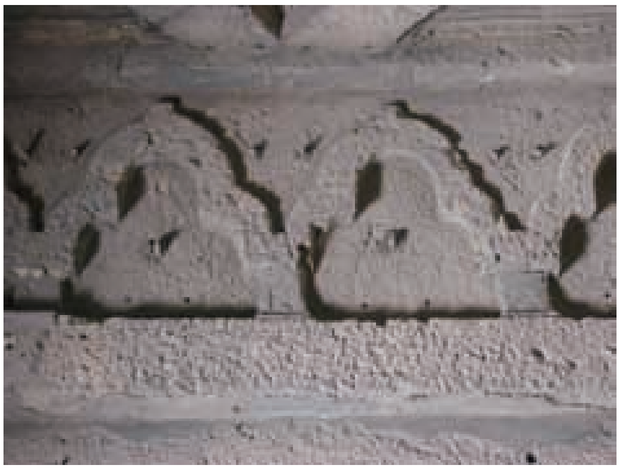


Figure 539 Cave 53-V: design of tambour.

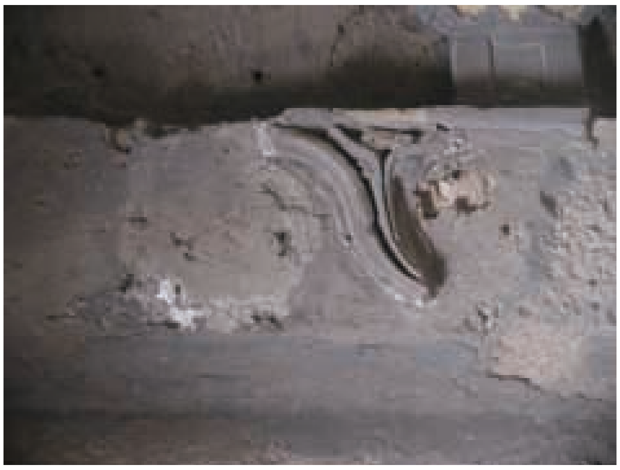


Figure 540 Cave 53-V: three-dimensional designs on the cornice.

Cave 53-VII

Location: Cave 53-VII is located on the western side of the Buddha's feet, and is the second cave from the cliff surface.

Form: Octagonal plan; domed ceiling; tambour. Trapezoidal niches are carved out of the side walls of the tambour, which is slightly offset inwards. Many regularly carved mortises were observed around the tambour.

Present condition: The explosion of the Buddha destroyed the eastern side of the cave and pieces of the sculpture are piled up inside.

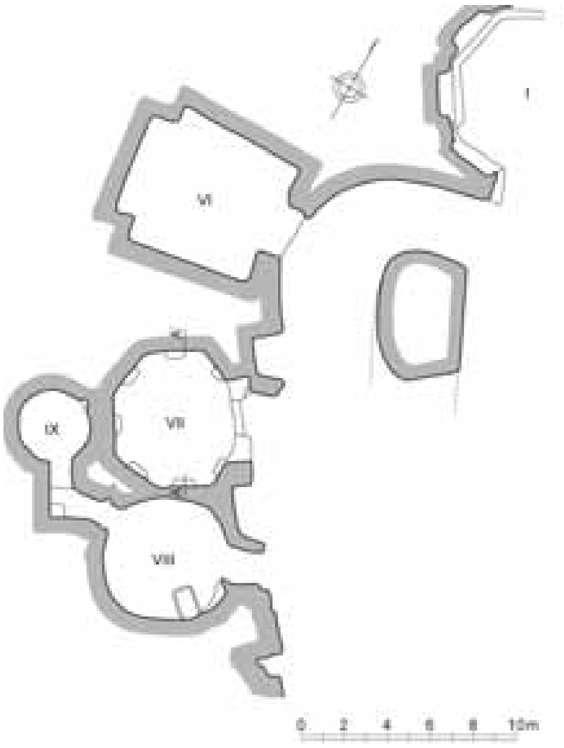


Figure 541 Cave 53-VII: plan (after Kodera *et al.* 1971).

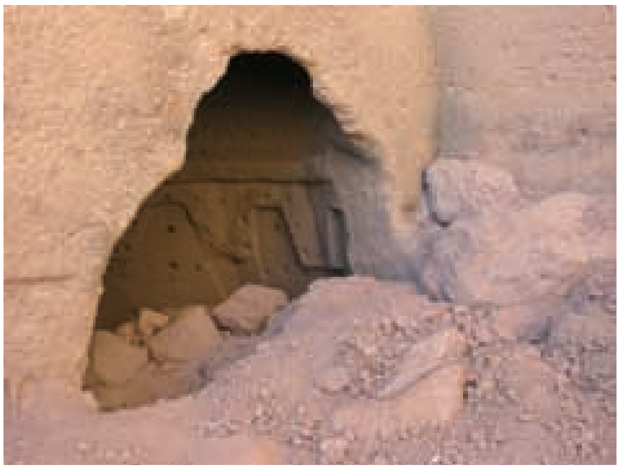


Figure 542 Cave 53-VII: general view.

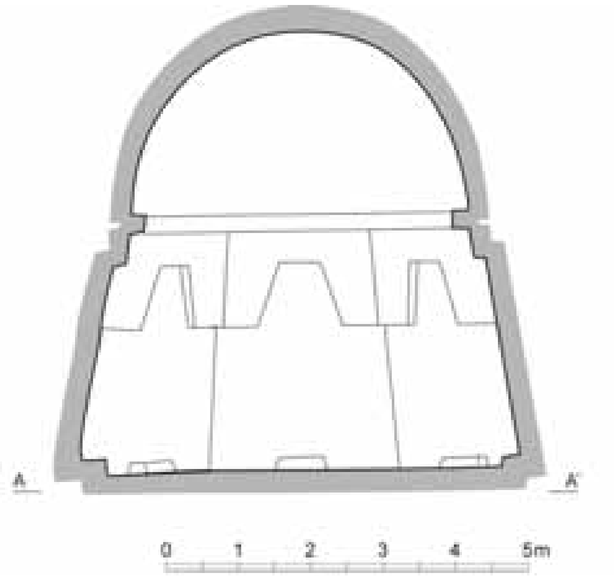


Figure 543 Cave 53-VII: section (after Kodera *et al.* 1971).

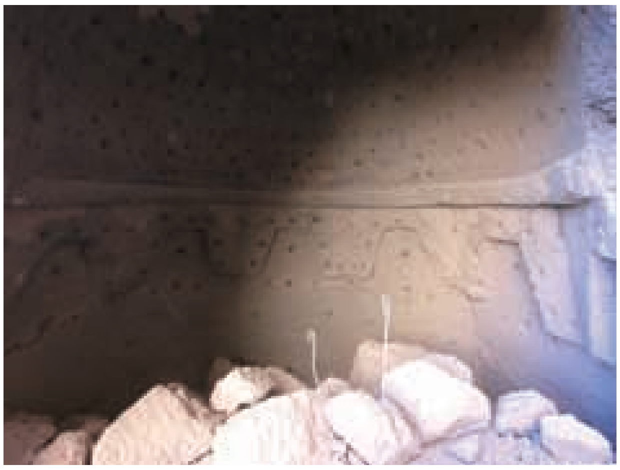


Figure 544 Cave 53-VII: western side.

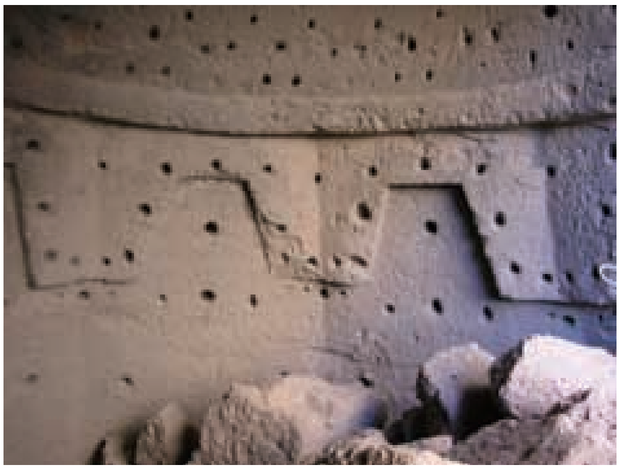


Figure 545 Cave 53-VII: northwest niche.

Cave 53-VIII

Location: Cave 53-VIII is located on the western side of the Buddha's feet, and is the closest cave to the cliff surface.
Form: Circular plan; domed ceiling. A staircase leading up the side of the cave can be observed on the southern part, but its lower section has already collapsed.
Present condition: The entrance to the cave has collapsed and masses of rocks are piled up inside.

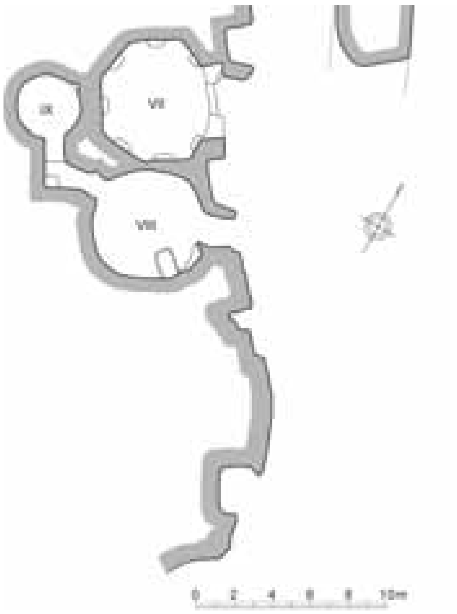


Figure 546 Cave 53-VIII: plan (after Kodera *et al.* 1971).

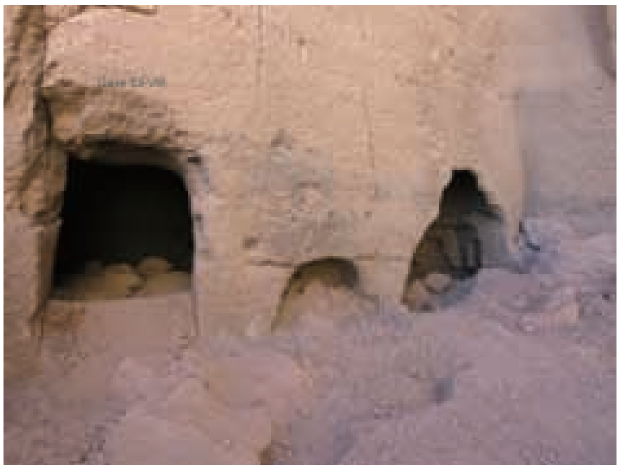


Figure 547 Cave 53-VII: general view.

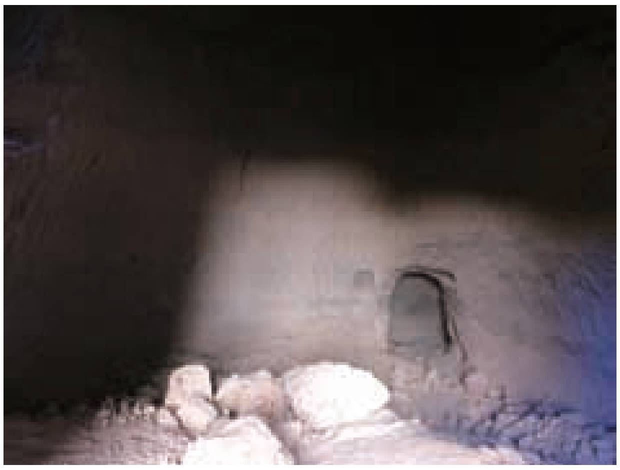


Figure 548 Cave 53-VII: western side.

Cave XV(b)

Location: Cave XV(b) is located on the western side of the Bamiyan Great Cliff, at the upper western part of the West cave-niche. It is located halfway up and west of the West cave-niche on the cliff wall.

Form: Square plan; *laternen-decke*. The cave has a square plan and a pyramid-shaped space above, with pilasters on the walls. A small dome is carved out of the middle of the *laternen-decke*. The plan's size is small but the cave has a relatively high ceiling. Caves XVI(c) and XIII(c) are similar to this cave, and all three are located in elevated positions west of the West cave-niche.

Technique and design: The height of the side walls is about 170 cm, above which are the pyramid-shaped walls with pilasters. There are pilasters with either a polygonal section or a double circular section, as well as one capital. The distance between the pilasters is small. The side walls consist of several thick wall clay layers. During the process of the pilasters' construction, first the shape was roughly carved out by stonemasonry and then the details were carried out with wall clay (Fig. 555). The *laternen-decke* has three steps on top of the beams, which rest on the pilasters (Fig. 554). The beams are decorated with clay, giving the impression of a wooden construction. Each end of the beams has a corbel-like design.

Present condition: The cave is carved out of a fragile conglomerate and is presently in poor condition. Half of the cave (the southwest part), has already collapsed and the interior of the cave is visible. Moreover, there are many structural cracks that run parallel to the cliff surface. Currently, this cave is accessible via a narrow passage from the next cave, which has a relatively large rectangular plan, but the southwestern wall has already collapsed. Therefore, the original entrance and access cannot be identified.

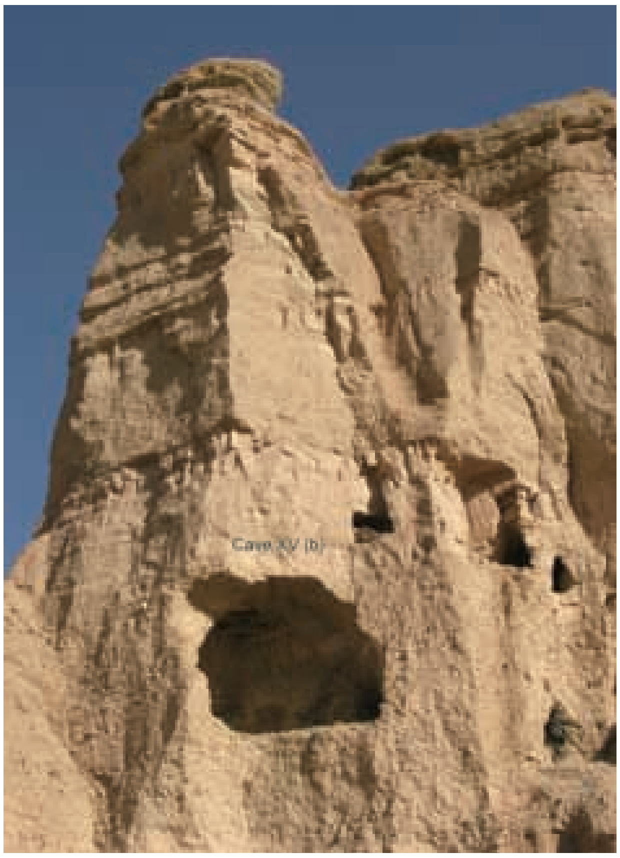


Figure 549 Cave XV(b): general view.

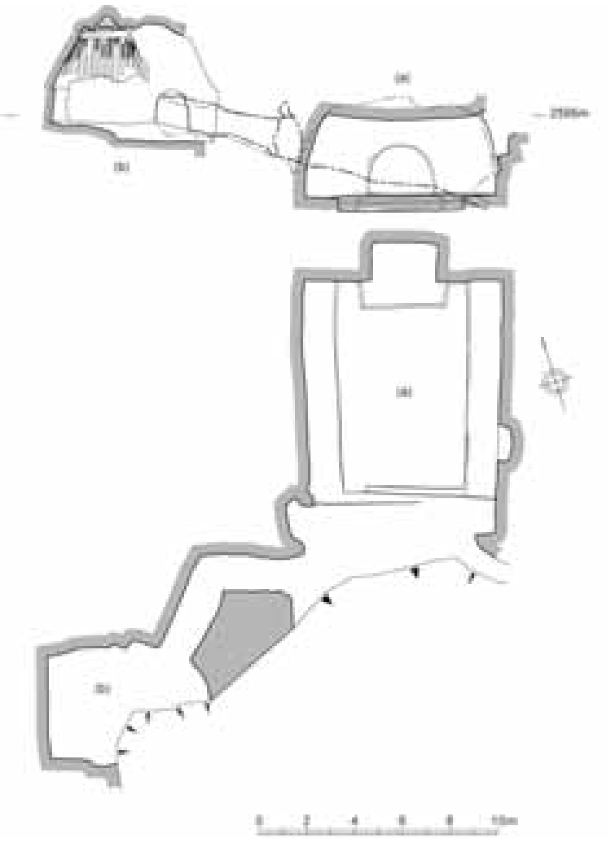


Figure 550 Cave XV(b): plan; section (measured by PASCO Corporation, Japan, in 2007).

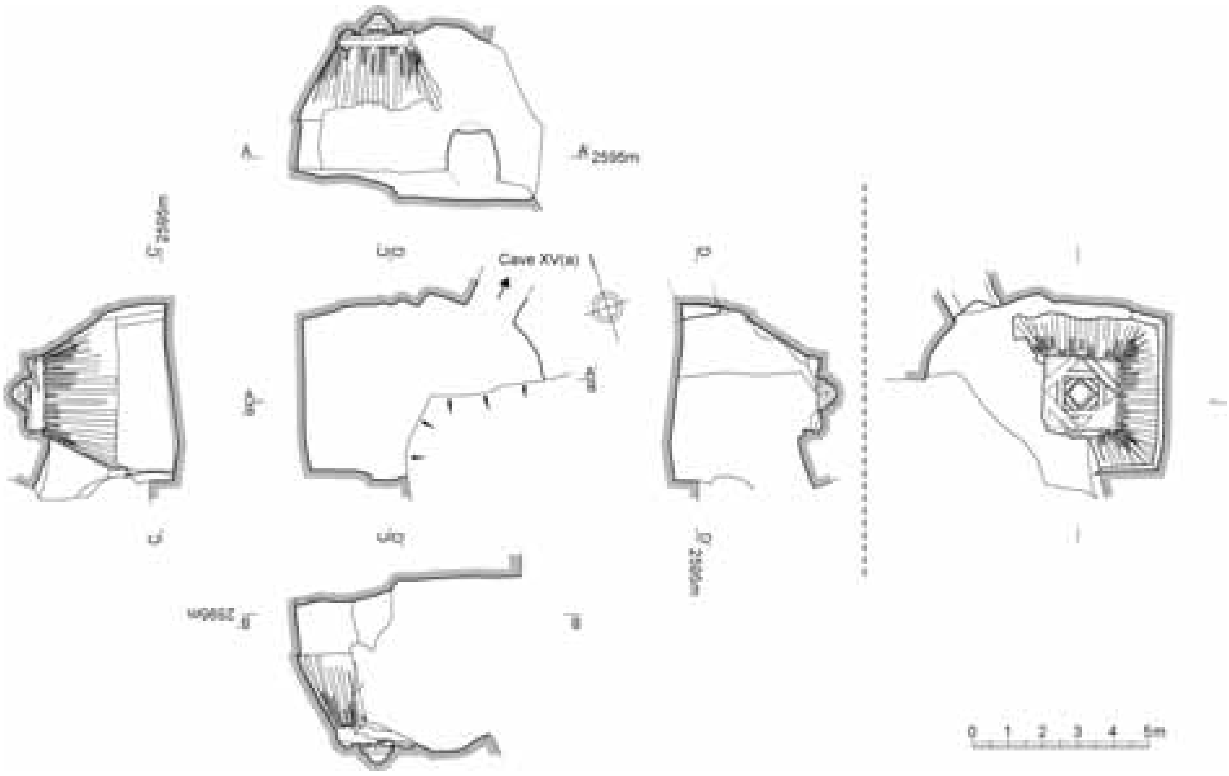


Figure 551 Cave XV(b): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

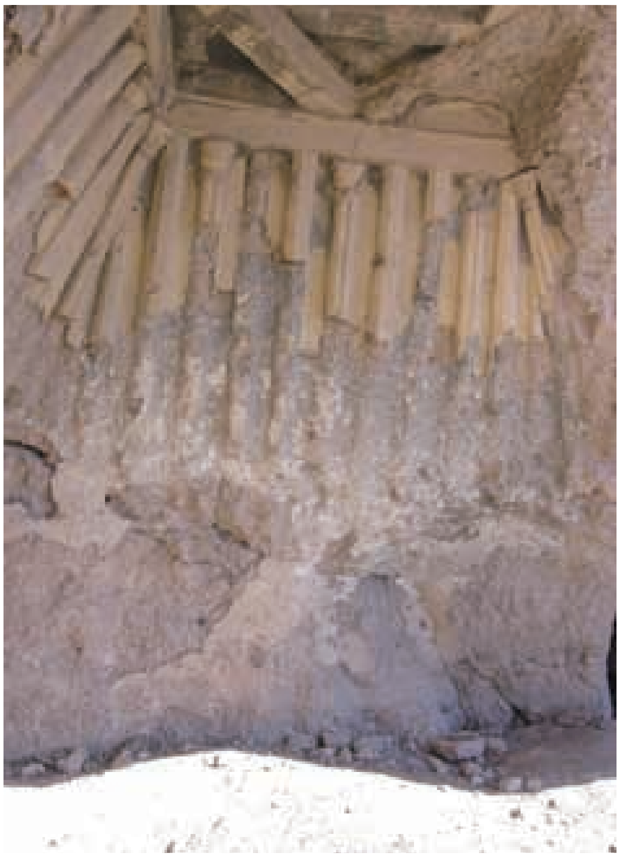


Figure 552 Cave XV(b): northern side.

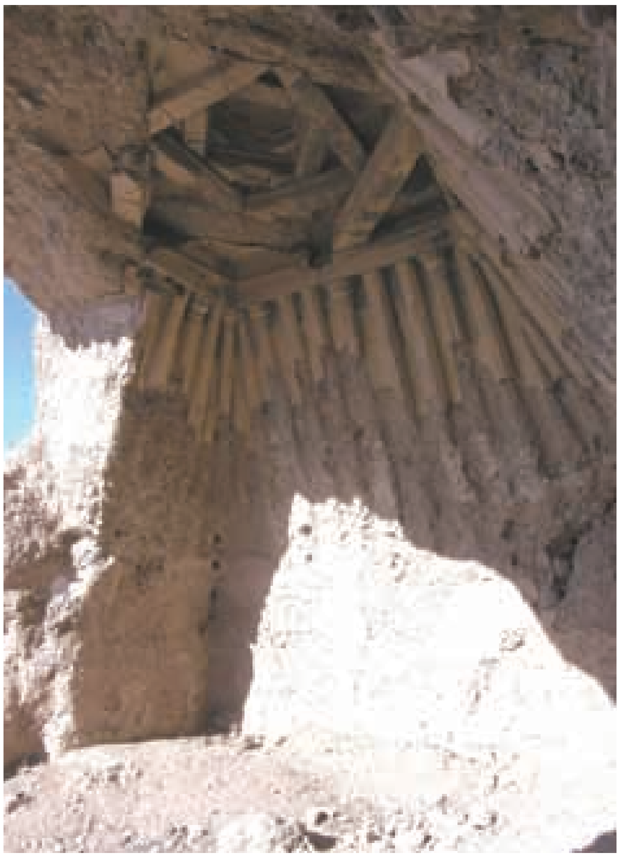


Figure 553 Cave XV(b): western side.

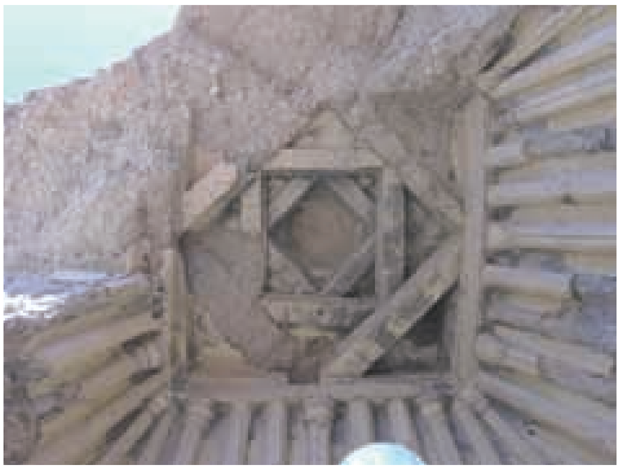


Figure 554 Cave XV(b): ceiling.

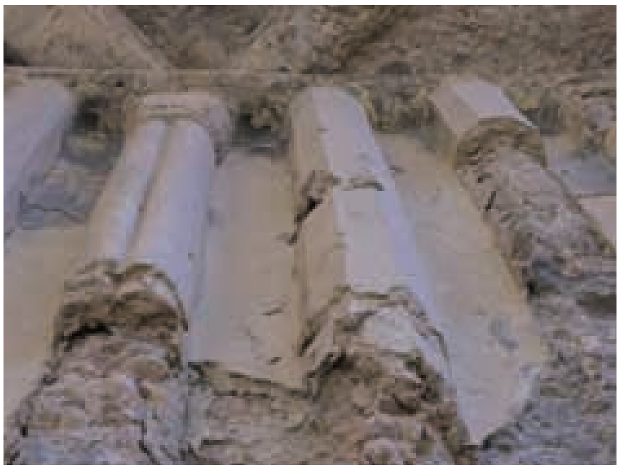


Figure 555 Cave XV(b): pilasters.

Cave XIV(a)

Location: Cave XIV(a) is the westernmost cave in the Bamiyan Great Cliff, located high on the cliff wall and west of the West cave-niche. It is below Caves XII, which are difficult to reach now. On its western side is found Cave XIV(b), which has a small rectangular plan. Both of these caves are part of Caves XIV.

Form: Cave XIV(a) has a rectangular plan and the south end of its flat ceiling has a semi-domed shape. It is a unique ceiling, and presumably the original cave with a domed ceiling was extended and transformed into a rectangular plan. The side walls are inclined gently and the northern wall and southern part of the eastern wall have niches.

Technique and design: The side walls have a thick belt design consisting of trefoil shapes (Fig. 561). Remains of colouring were observed inside several of these shapes. This design is reminiscent of that of a cave with a centred plan and tambours, but another example of a cave with a rectangular plan with such a design has not been found in Bamiyan. The trefoil shapes continue on the side wall below the half-dome; however, they are shallower here. There is a tambour between the trefoil bend and the dome, and two short columns are carved out on the western and eastern sides. Since the design of the tambour is obviously different between the domed ceiling and the flat ceiling, the rectangular part, which is located at the end, was probably transformed at a later stage.

Present condition: There are three openings, which were made later, near the southern side of the entrance. In addition, there are also three openings on the cliff surface. Finishing wall clay partially survives on the side walls and the ceiling. Large vertical cracks were observed on the western and eastern walls.

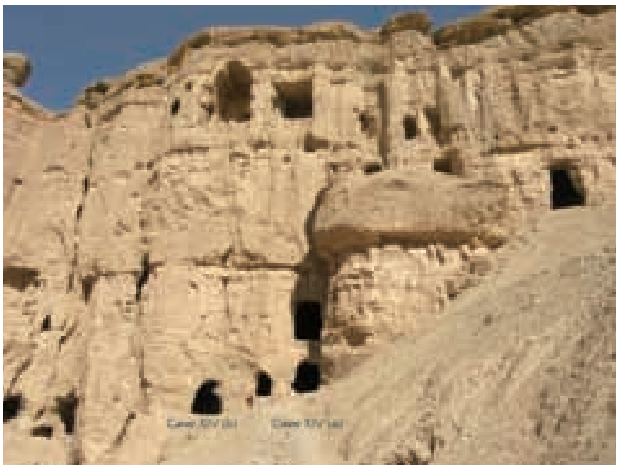


Figure 556 Cave XIV(a): general view.

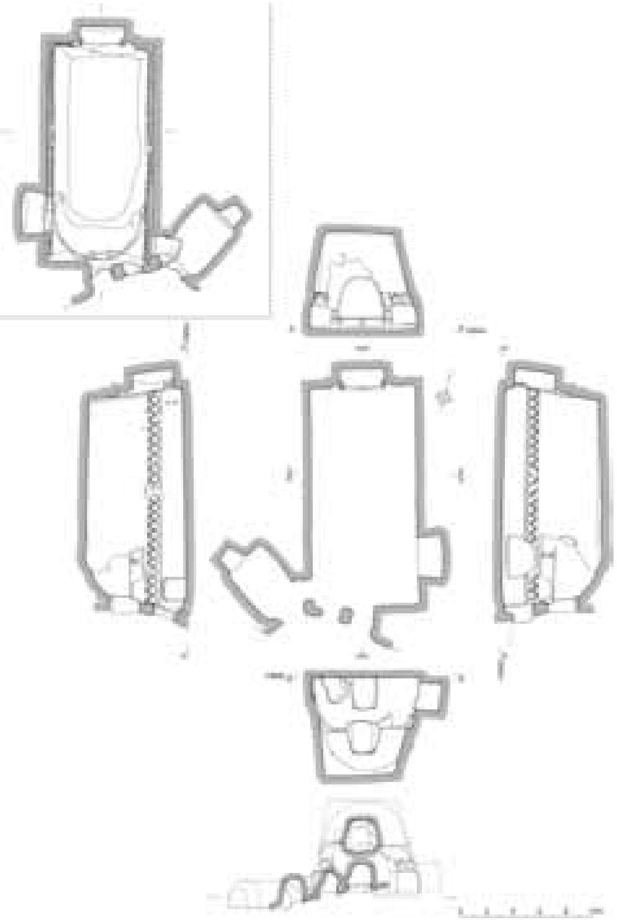


Figure 557 Cave XIV(a): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

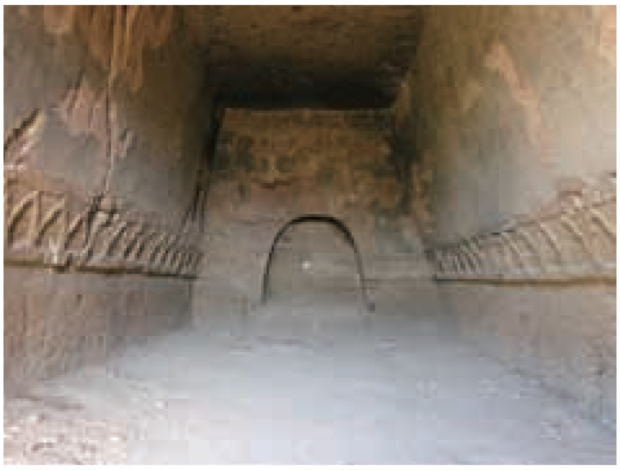


Figure 558 Cave XIV(a): northern side.

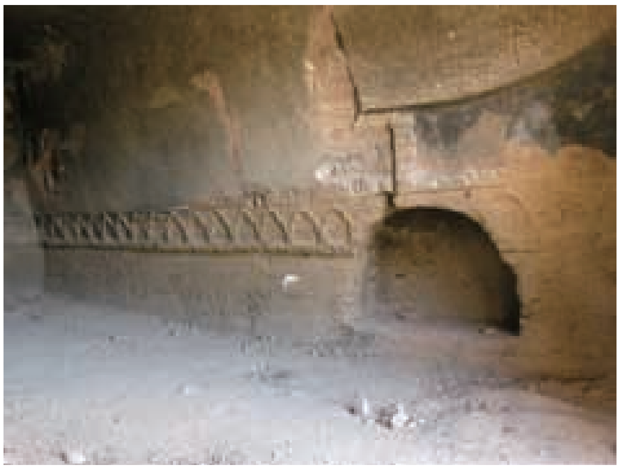


Figure 559 Cave XIV(a): eastern side.

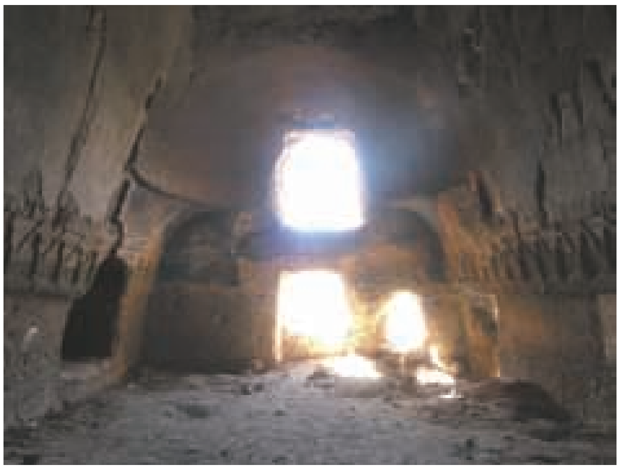


Figure 560 Cave XIV(a): southern side.

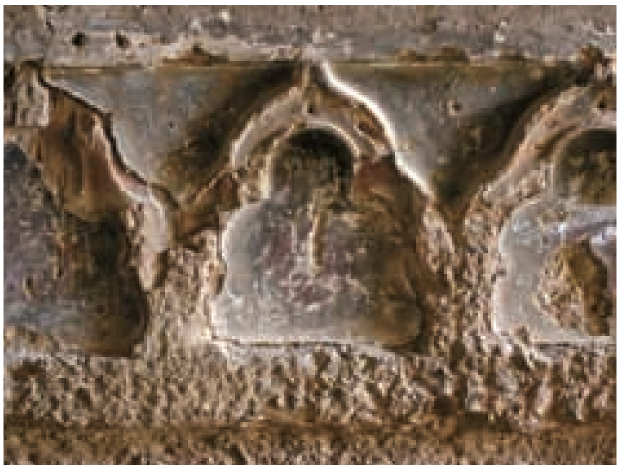


Figure 561 Cave XIV(a): trefoil shapes on the side walls.

Cave XIII(c)

Location: Cave XIII(c) is located near the westernmost cave of the Bamiyan Great Cliff, halfway up the west cliff wall and west of the West cave-niche. There are two more caves with rectangular plans, and all of them are categorised as part of Caves XIII.

Form: Square plan; *laternen-decke*. Cave XIII(c) has a square plan with pyramid-shaped walls and a relatively high ceiling. It is similar to Cave XV(c).

Technique and design: The side walls incline from the floor to the ceiling. Except for two niches on the west and east walls, no remains of three-dimensional designs were observed. Pilasters are carved out of the rock on the upper part of the side walls. The ends of the pilasters have edges with wall clay, and it appears that the intention was to make square pilasters. It is quite possible that the pilasters were created by modelling, just as in Cave XV(b), but most of the surface has been destroyed and it is impossible to determine the details based on what remains of the finishes. However, at least two layers of wall clay have been found, based on the small remains. The surfaces of the wall clay are now covered by black soot. It appears that this cave used to have wall paintings, but this is uncertain.

The *laternen-decke* does not have a dome in the middle and the structure of the three stepped beams has been carved out, creating a sense of larger spatial depth. However, this cave does not give the same wooden impression as in Cave XV(b). This form, with pilasters on the side walls and a high *laternen-decke* with a relatively small plan, is found mostly in caves near the West cave-niche. The cave's functions, date of construction and relationship to Cave XV(b), which has a similar form, can be the subjects of future research.

There is a row of square holes at the upper part of the cave, on the outside of the entrance (Fig. 563). They are believed to have been components of a wooden construction, such as eaves. A row of holes such as this one can be observed above Cave XIII(b), Cave VIII(c), which is next to Cave XIII(b), and at the upper part of Caves XIII1, which are located above Cave VIII(c).

Present condition: The side walls are severely damaged. Not only did the wall clay peel off, but the surface of the rock appears also to have been destroyed. There are several long vertical cracks on the side walls. The side walls near the entrance have broken away, corresponding to the rock's stratum.

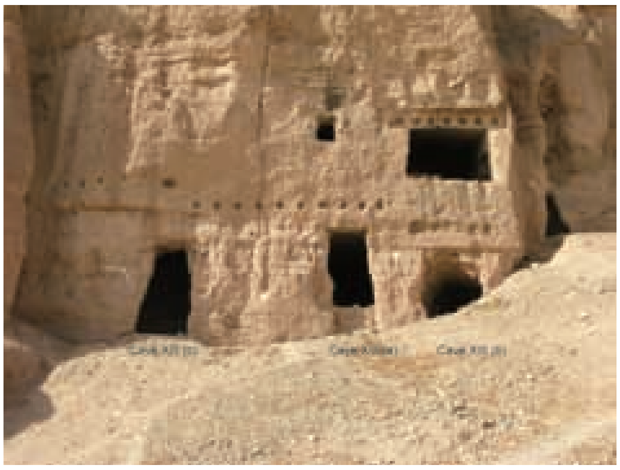


Figure 562 Cave XIII(c): general view.

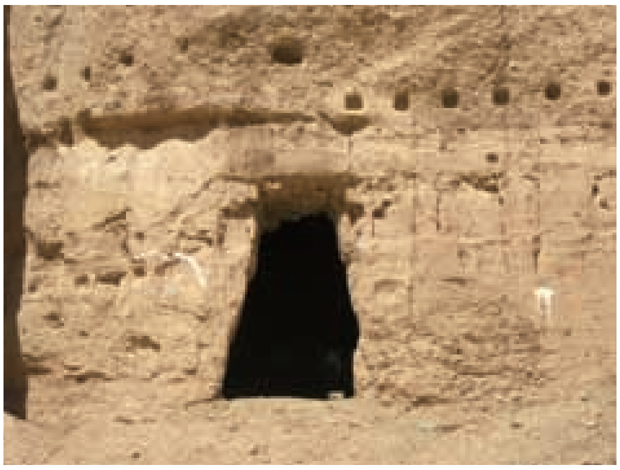


Figure 563 Cave XIII(c): entrance.

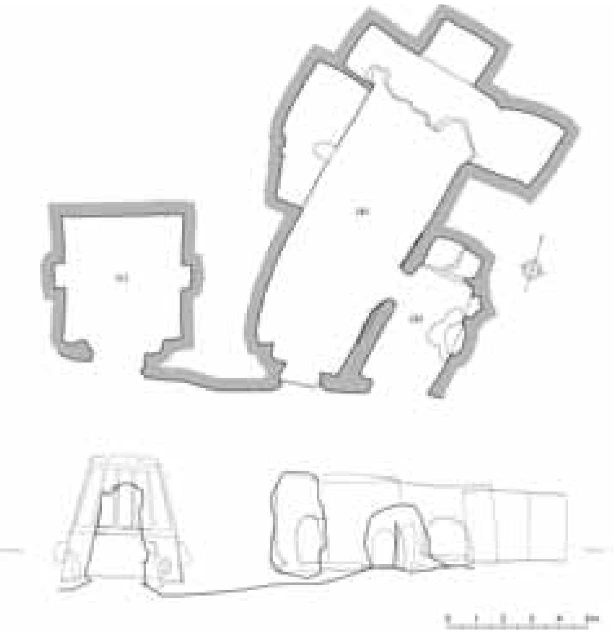


Figure 564 Cave XIII(c): plan; elevation (measured by PASCO Corporation, Japan, in 2007).

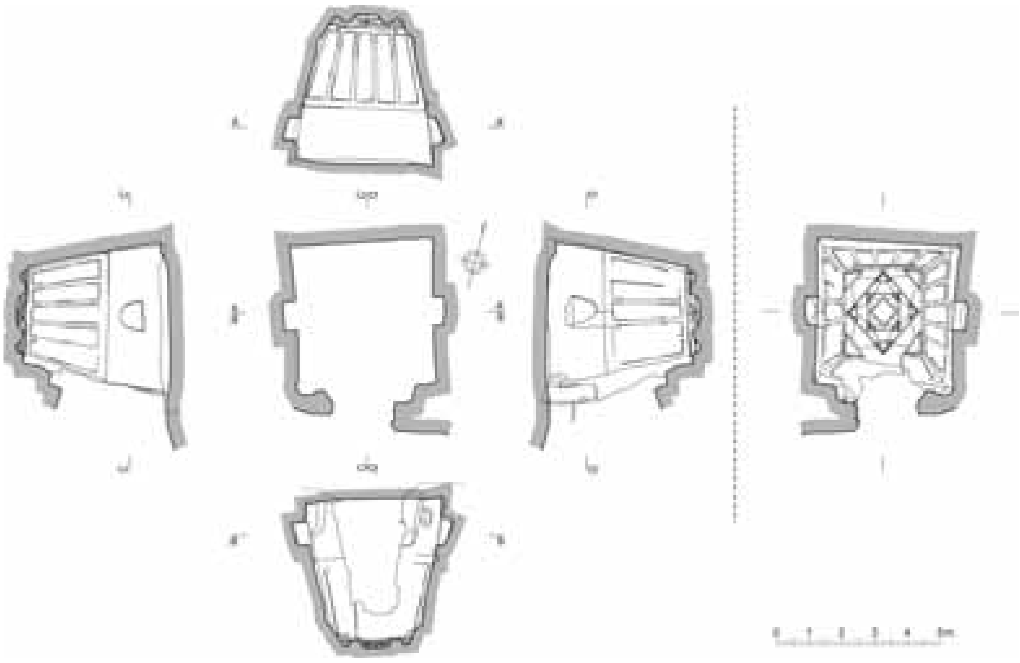


Figure 565 Cave XIII(c): plan; section; ceiling (measured by PASCO Corporation, Japan, in 2007).

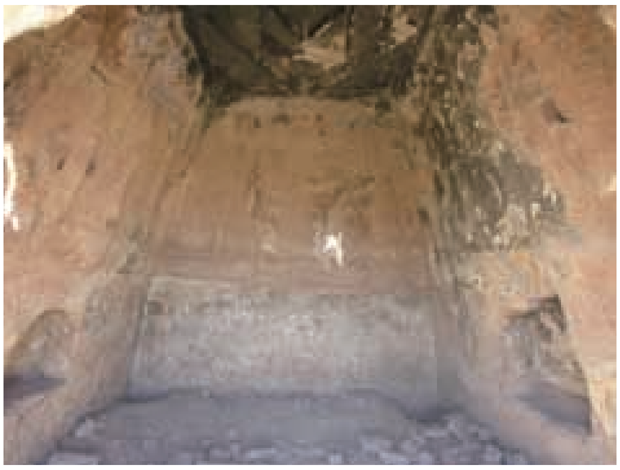


Figure 566 Cave XIII(c): northern side.

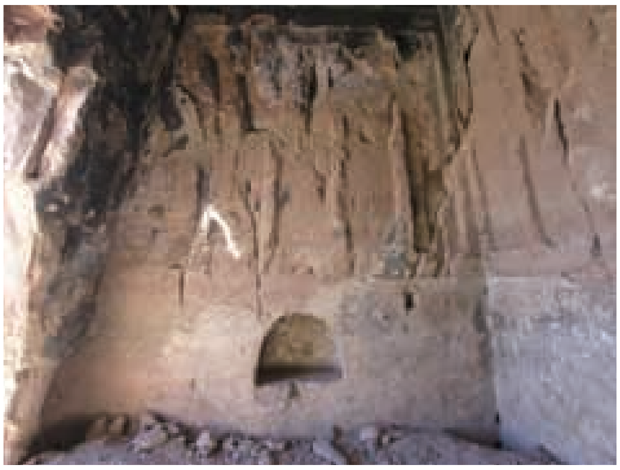


Figure 567 Cave XIII(c): western side.

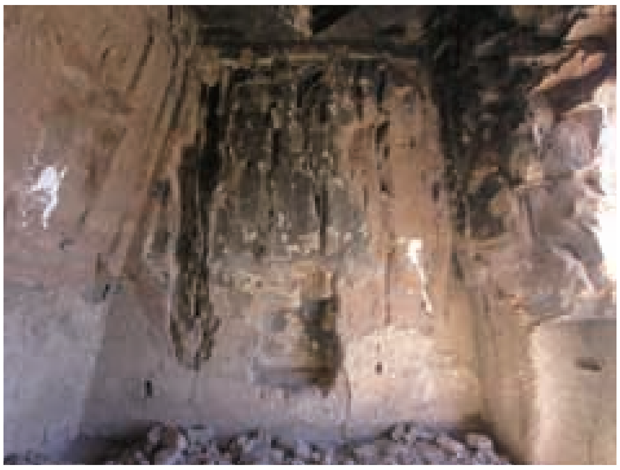


Figure 568 Cave XIII(c): eastern side.

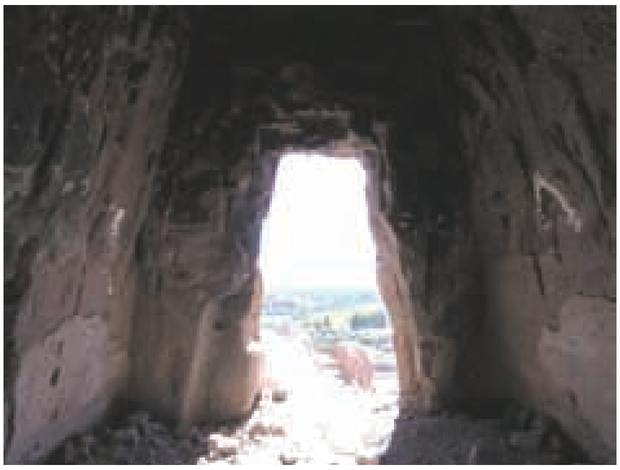


Figure 569 Cave XIII(c): southern side.

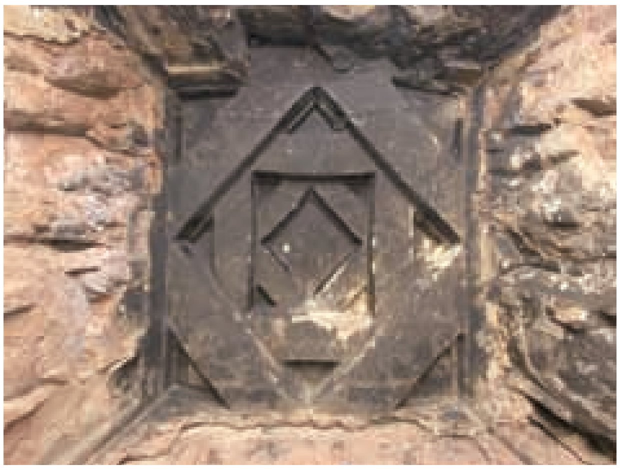


Figure 570 Cave XIII(c): ceiling.

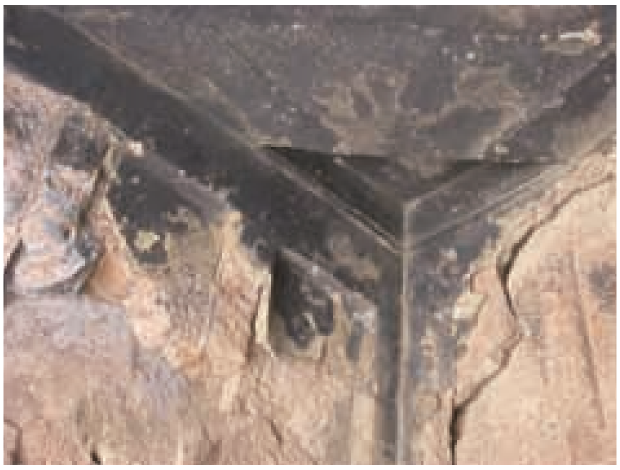


Figure 571 Cave XIII(c): corner of the ceiling.

Caves XIII1

Location: Caves XIII1 are located near the westernmost part of the Bamiyan cliff, halfway up the west cliff wall and west of the West cave-niche, above Cave XIII. There are two caves, accessible via a staircase, situated east of the caves.

Form: Both caves, Caves XIII1(a) and XIII1(b), have rectangular plans with flat ceilings. The northern wall of Cave XIII1(b) contains a niche.

Present condition: A crack runs through both caves and is visible on the eastern and western walls of each cave.

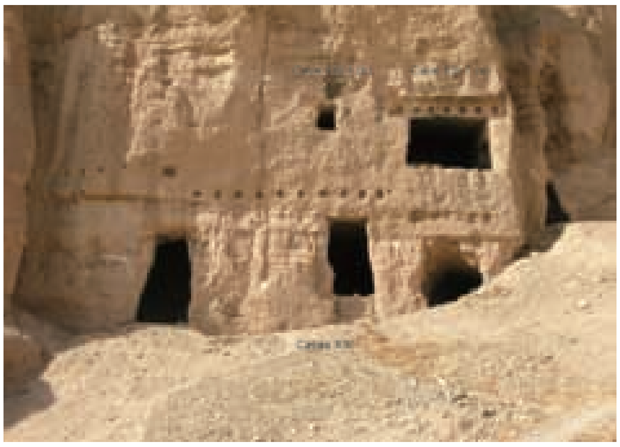


Figure 572 Caves XIII1: general view.

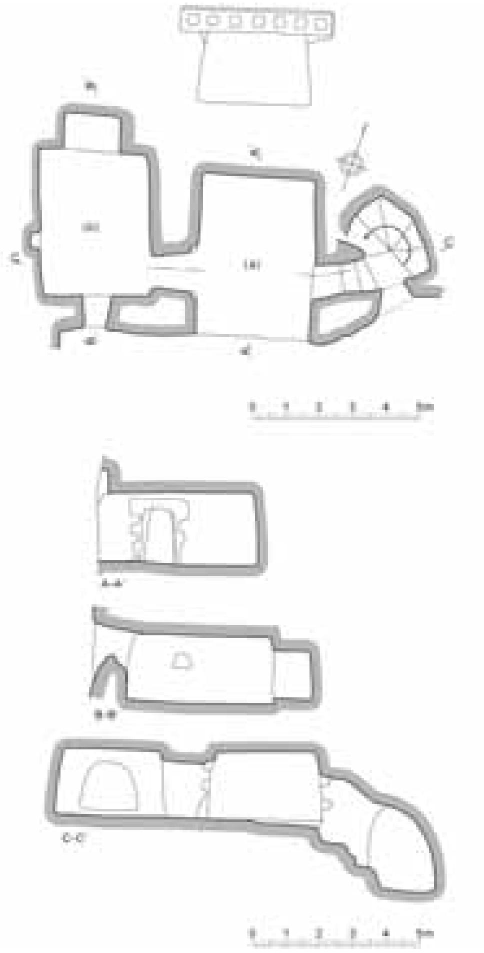


Figure 573 Caves XIII1: plan; elevation; section (after Kodera *et al.* 1971).

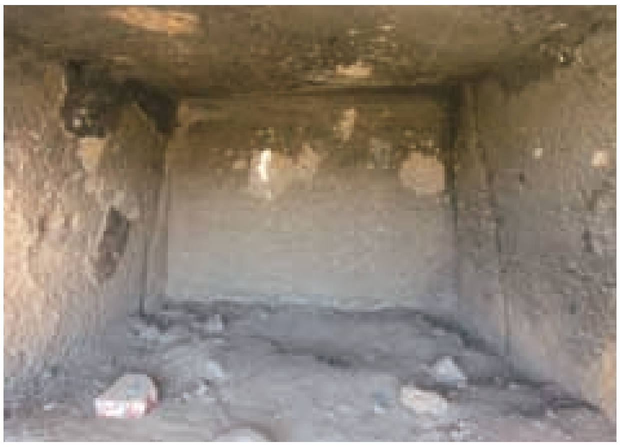


Figure 574 Cave XIII1(a): northern side.

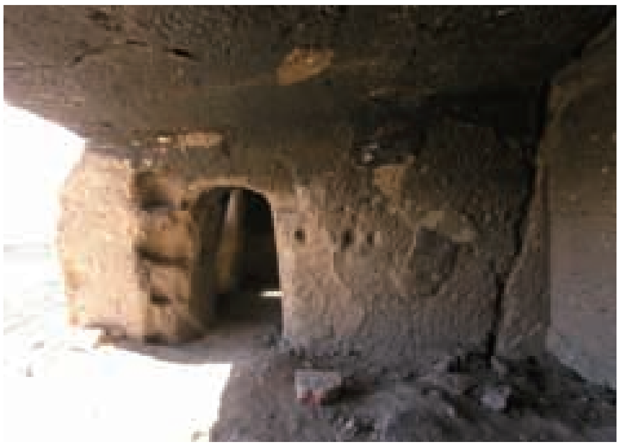


Figure 575 Cave XIII1(a): western side.

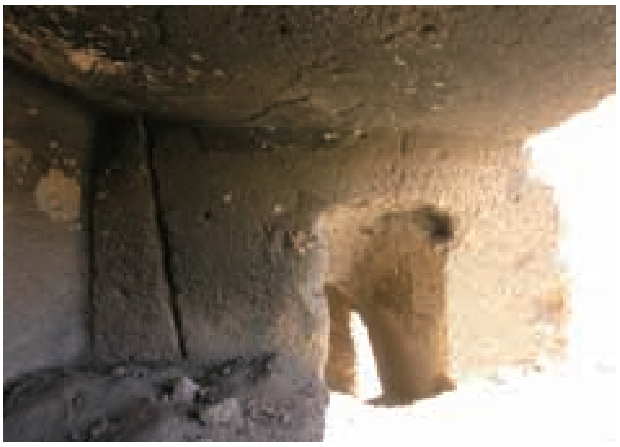


Figure 576 Cave XIII1(a): eastern side.

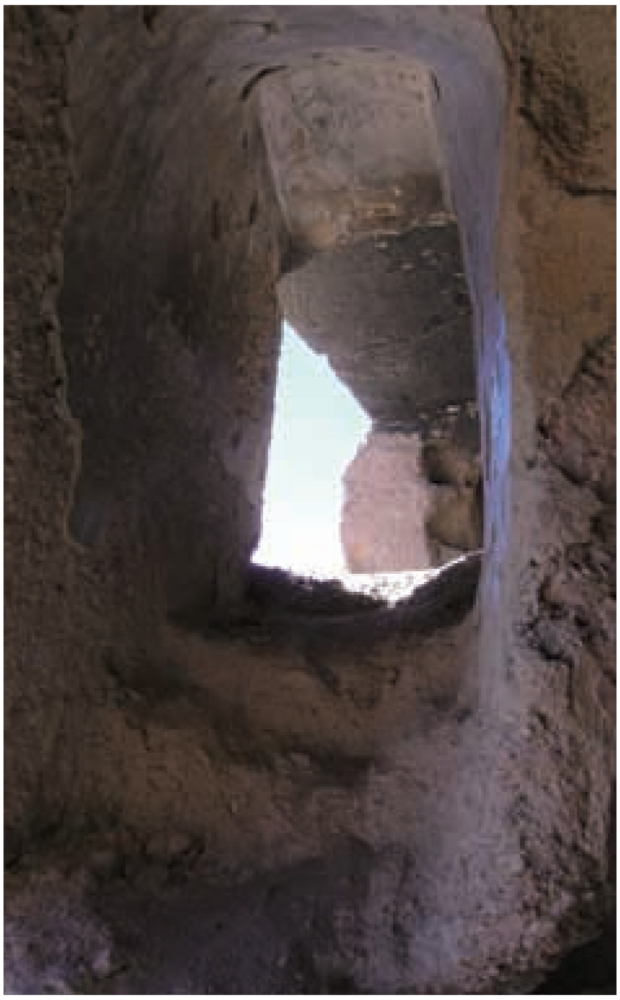


Figure 577 Cave XIII1(a): entrance.

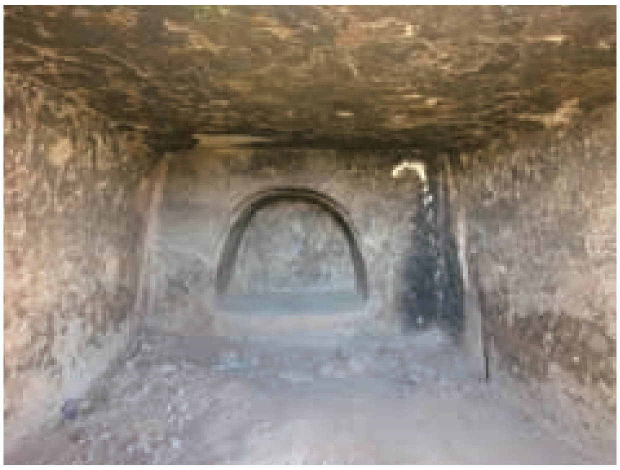


Figure 578 Cave XIII1(b): northern side.

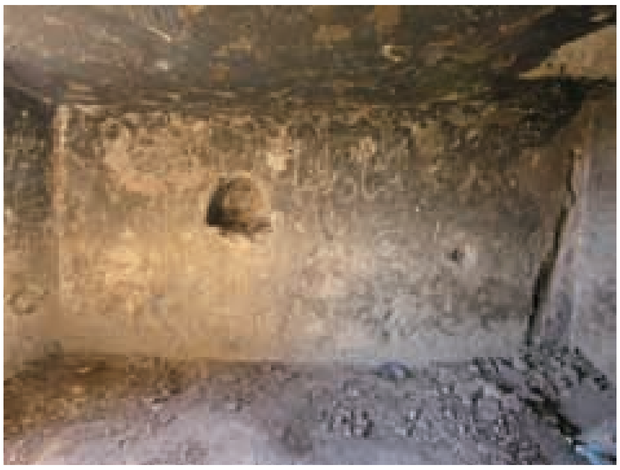


Figure 579 Cave XIII1(b): western side.

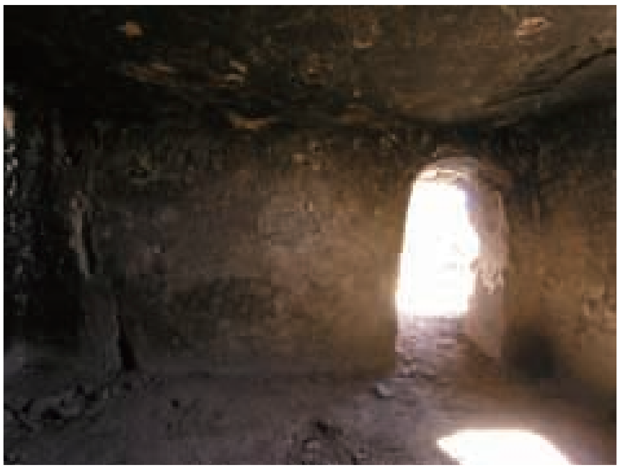


Figure 580 Cave XIII1(b): eastern side.

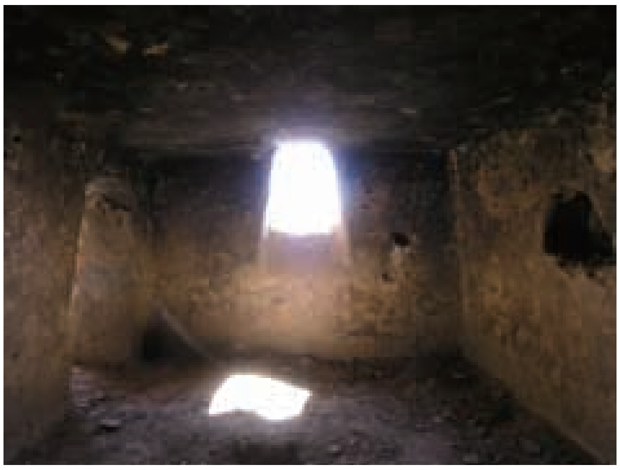


Figure 581 Cave XIII1(b): southern side.

Chapter 5 Survey of the caves in the Foladi Valley

Introduction

The cluster of Buddhist caves in the Foladi Valley is only one component of the Bamiyan World Heritage site. These caves are rarely in the spotlight, probably because they are located at a slight distance from the Bamiyan Great Cliff. The layouts and forms of these caves have already been documented and reported (Nishikawa 1964, 1984). In addition, recent research reveals that the mural paintings in the Buddhist caves in the Foladi Valley date from approximately the second half of the seventh century to the ninth century, therefore they are relatively new among the Buddhist mural paintings in the Bamiyan site (Yamauchi 2006a).

The aim of this visual observation is to examine the present condition of the Buddhist caves in the Foladi Valley within the framework of the larger investigation of the Buddhist caves in the Bamiyan Valley and in light of previous research.

Overview of the Buddhist caves in the Foladi Valley

The Buddhist caves in the Foladi Valley are located in the Ahingar Valley, which is almost 2.5 km southwest of the Bamiyan Valley. The main Buddhist caves are scattered on the cliff at the back of the V-shaped valley, with the exception of several caves to the west of an entrance to the valley and a watchtower on the top of a mountain in the southeast (Fig. 584).

These caves were used as residences for many years, as were the caves on the Great Cliff in Bamiyan. Currently, the caves on the western cliff are uninhabited, while the eastern caves are populated and enclosed by a newly built wall, making it difficult to observe the front of the eastern caves. Furthermore, there are relatively modern buildings at the foot of the cliff near the entrance to the valley, as well as the enclosure wall, which covers a large area (Fig. 583). These new features are problematic since this area is part of the Bamiyan World Heritage site.

Although the Buddhist caves in the Foladi Valley are covered with black soot and have also been spoiled by artificial changes to the floor and walls, they do not appear to have been severely damaged during the civil war – possibly because they do not contain the Buddhist images that are so often targets of attack. As we will discuss later, the Great Buddha statue in the Kakrak Valley was destroyed during the war, which indicates that geography alone – the Foladi Valley is some distance from the centre of Bamiyan – cannot explain why the caves in the Foladi Valley were spared.

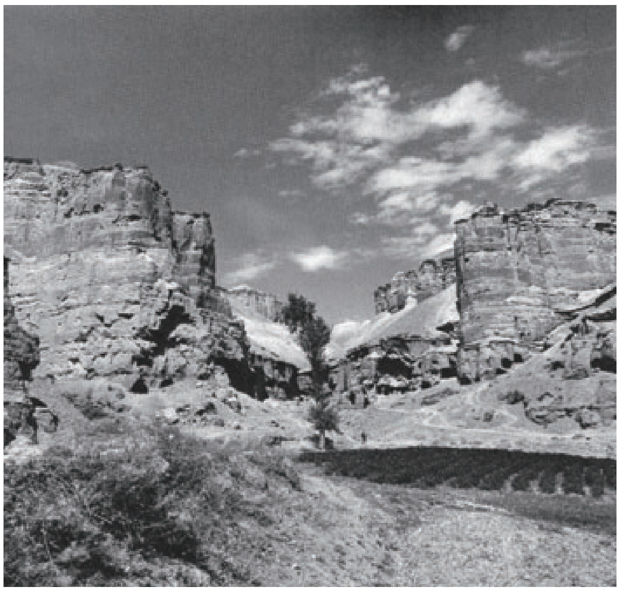


Figure 582 Foladi Valley: 1970s (after Higuchi 1984) (courtesy of Kyoto University).

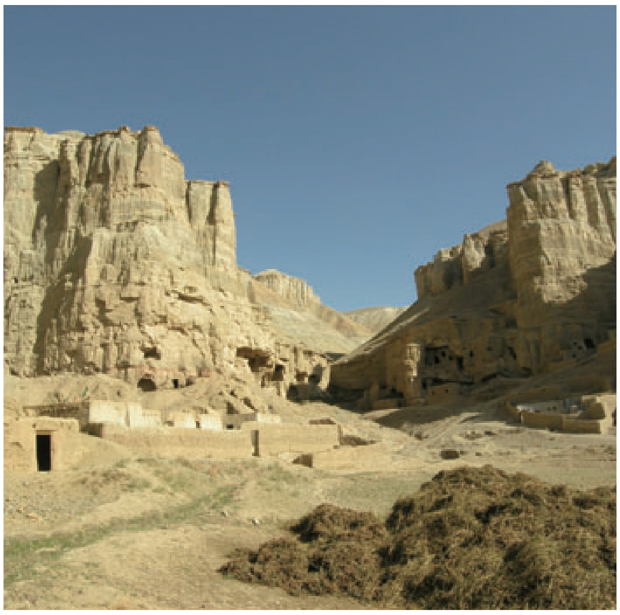


Figure 583 Foladi Valley: 2006.

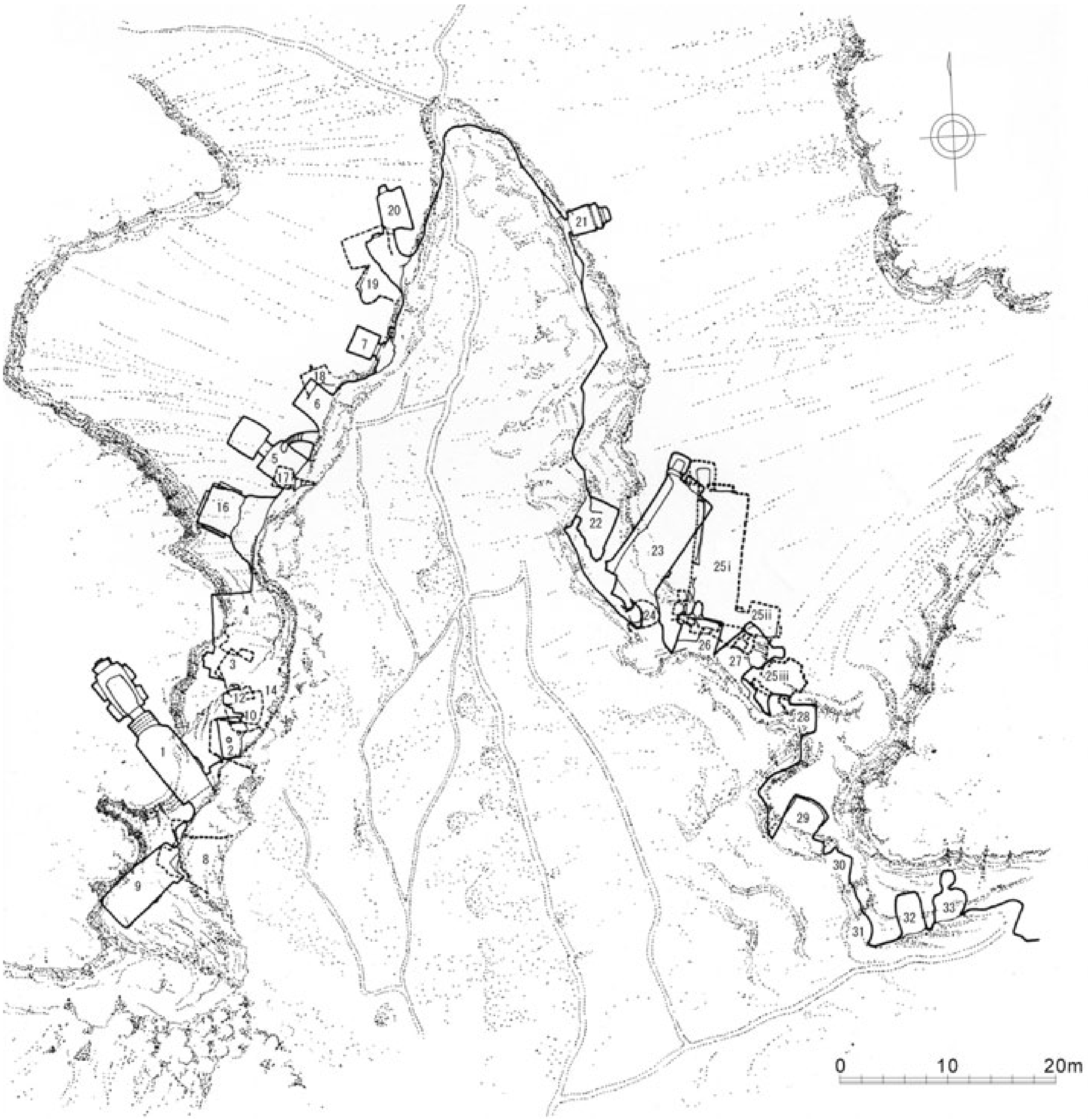


Figure 584 Buddhist caves in the Foladi Valley: plan (after Higuchi 1984).

Layout, form and design

Layout

Cave West A is on the western cliff at the entrance to the valley and features a square plan, shallow domed ceiling and a squinch with fivefold arches on the four corners (Figs 585, 586). This cave was closed for conservation after mural paintings were discovered and remains closed today. A huge crack runs down the south-facing bedrock. Near Cave West A is Cave West B, which features a tambour and trefoil arcade. The bedrock of these caves has entirely collapsed and the caves are massively damaged.

The caves at the back of the valley are situated at various levels on the cliff. It is impossible to examine their original accesses because of the collapse of the cliff surface. Cave 5 is equipped with stairs leading up from the ground (Fig. 587); however, it is unclear from the current situation if this staircase has existed since the cave's original construction. Compared to the Buddhist caves on the Bamiyan Great Cliff, it appears that the caves in this valley are not connected to each other and are instead placed individually on the cliff.

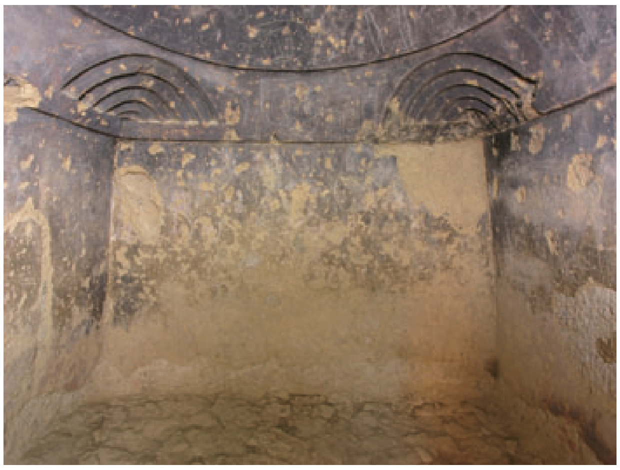


Figure 585 Foladi Cave West A: western side.

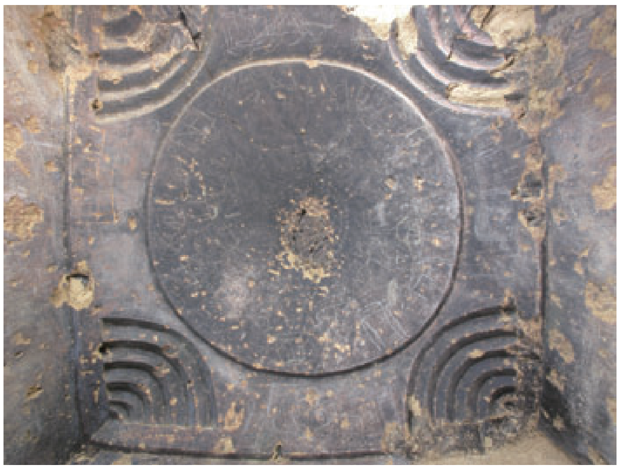


Figure 586 Foladi Cave West A: ceiling.

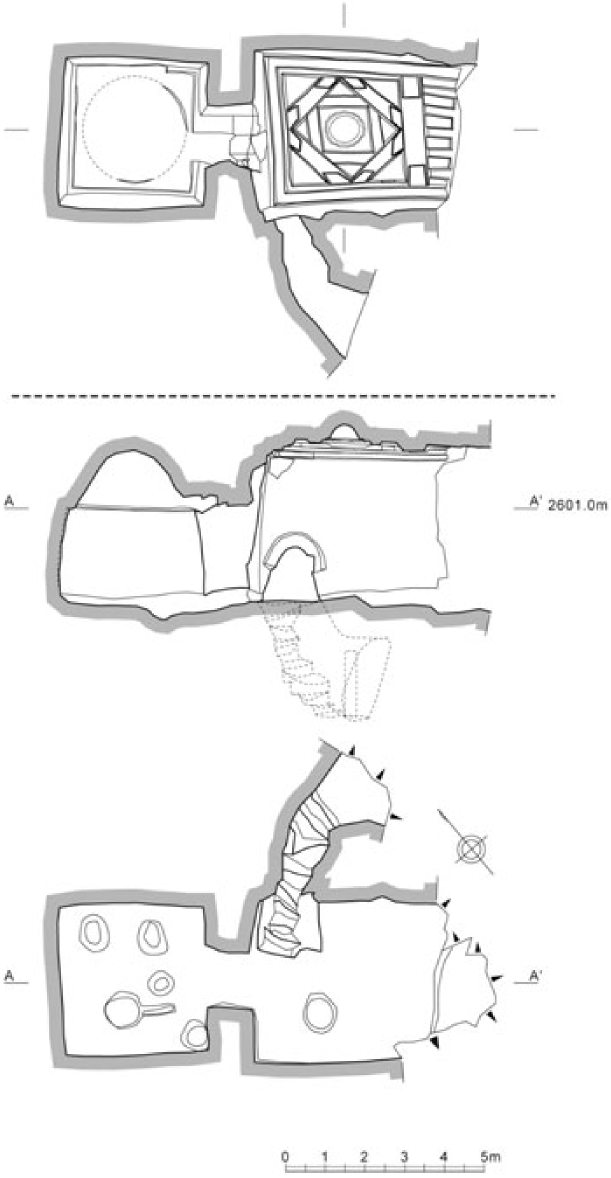


Figure 587 Foladi Cave 5: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

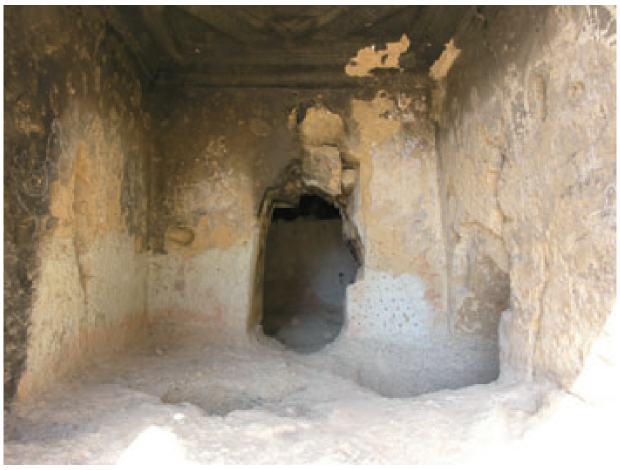


Figure 588 Foladi Cave 5: front room (southwestern side).

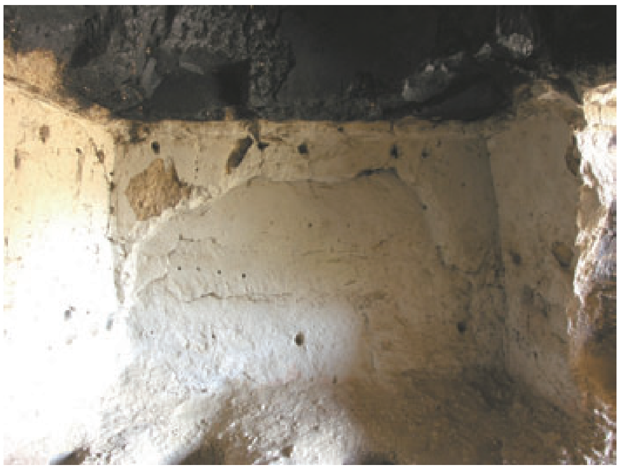


Figure 590 Foladi Cave 5: rear chamber (northeastern side).

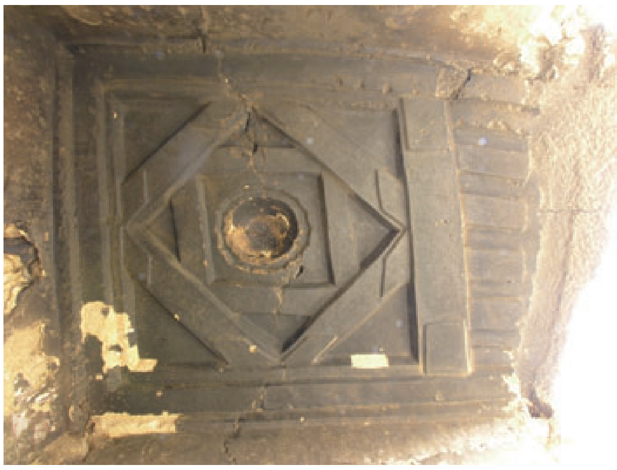


Figure 589 Foladi Cave 5: front room (ceiling).

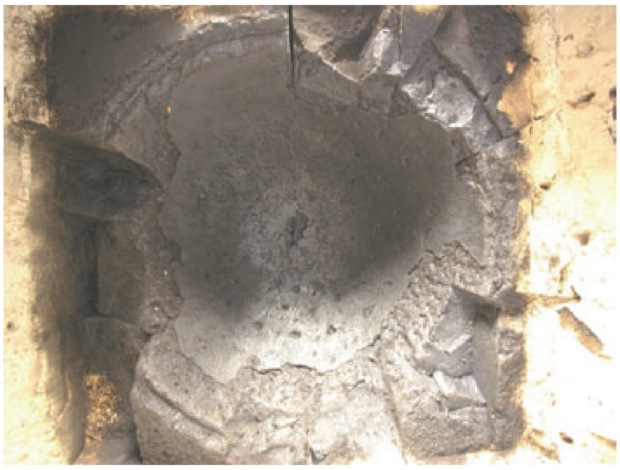


Figure 591 Foladi Cave 5: rear chamber (ceiling).

The caves used as residences on the eastern cliff mainly have rectangular plans and vaulted ceilings. On the western cliff, the architectural designs of the caves are characterised by square plans. No circular or octagonal plans have been verified; moreover, there are no cave-niches for either standing or seated Buddha statues.

The combinations of the neighbouring caves are varied. Cave 1 is a deep cave consisting of a front room with a rectangular plan and vaulted ceiling, and then a rear chamber. Caves 3 and 4 respectively have a vaulted ceiling and a *laternen-decke* side by side (Fig. 592). Cave 5 has the most distinctive assemblage: two rooms with a square plan connected towards the back of the cave (Fig. 587). One room features a *laternen-decke* (Fig. 589), and the other has a domed ceiling (Fig. 591). It is necessary to go through the room with the *laternen-decke* in order to reach the room with the domed ceiling, which means that the former is a front room and the latter is a rear chamber.

The combination of the square-planned rooms with the individual *laternen-decke* and domed ceiling is also found around the East Giant Buddha in the Great Cliff in Bamiyan. This style appears to have been very popular at some point. In the case of the Bamiyan Great Cliff, however, two rooms are connected horizontally to the surface and share a forecourt or a corridor, making it difficult to demonstrate the different functions of these two chambers and their relationship to each other. The evidence from Cave 5 in the Foladi Valley suggests that both rooms – one with the domed ceiling and the other with the *laternen-decke* – are closely associated in function in some way.

Form and design

Four caves (Caves 4, 5, 6, and 7) all have what resemble eaves extending outwards on the ceiling, and their rafters and beams are eaves-like features engraved on the bedrock (Figs 595–597). Among the caves in the Great Cliff in Bamiyan, this type of relief has not been confirmed except in Cave D, which is equipped with some rafter-shaped reliefs at the front (Fig. 363). These eave-shaped

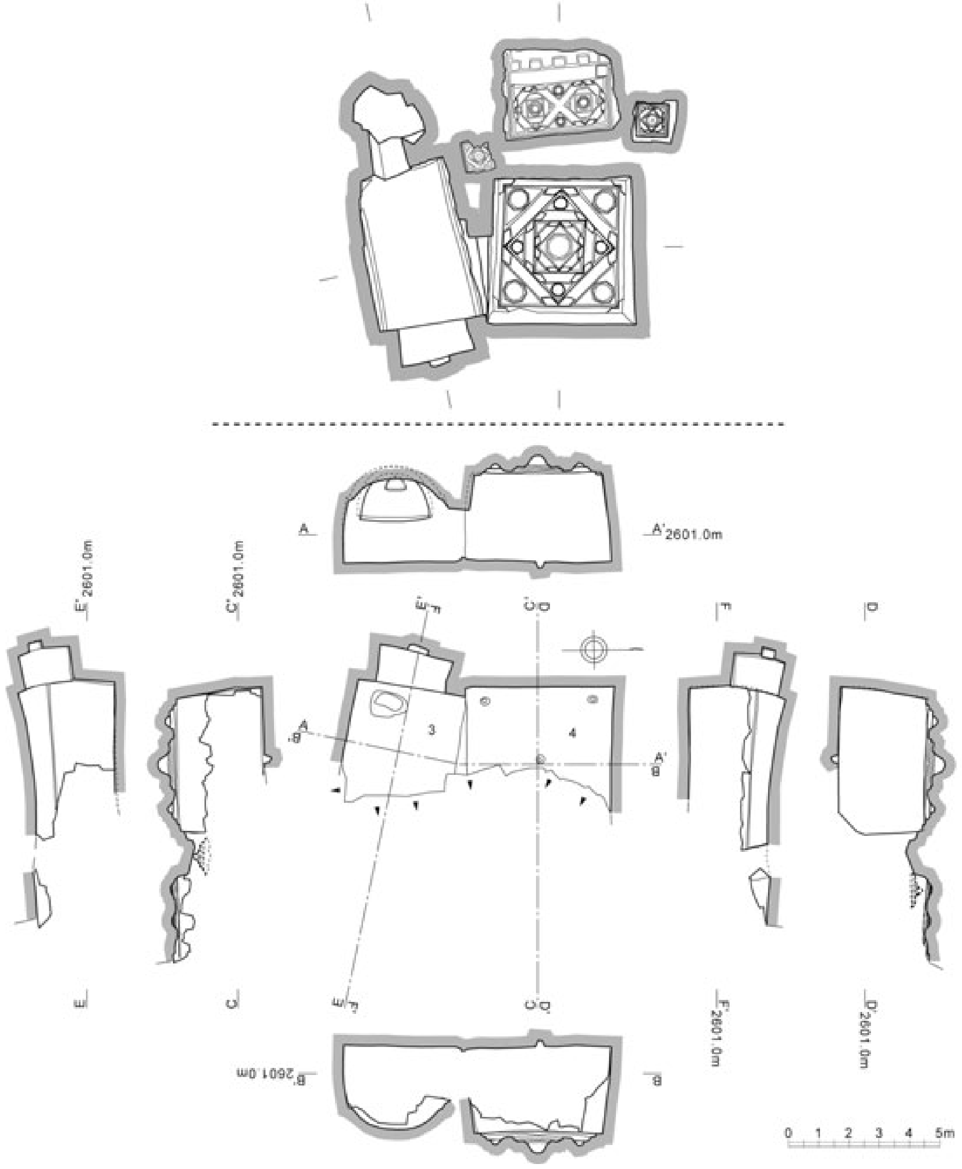


Figure 592 Foladi Caves 3 and 4: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

reliefs in the Foladi Valley are significant examples of cave front designs that have already been lost.

Furthermore, the caves in the Foladi Valley demonstrate characteristic designs on the elaborate *laternen-decke* on their ceilings. The ceilings feature a dome at the centre, and the upper joist is cut so as to be set at half the height of the lower one. A possible corbel is carved at the point where the upper and lower joists are connected. Earlier research suggested that this part could have been a wedge (Nishikawa 1984) in which the inner joist was to be placed in the outer. It is unlikely, however, that the inner part is wedged into the outer. Thus, it is reasonable to consider that this represents the corbel derived from wooden architectures holding supporting components.

Cave 4 has lost its walls and half of the floor, and only the ceiling remains in the cave. This ceiling has some *laternen-deckes*, two of which run parallel to the edge of cliff (Figs 592, 595). There are small *laternen-deckes* on both sides. As there is no wall or floor, a precise plan has not been confirmed. The *laternen-decke* in Cave 6 is equipped with three-stepped square corbels on each surface, out of which is carved the Thousand Buddhas (Fig. 596). This design is similar to Cave F3(g) on the Great Cliff in Bamiyan. In Caves 2 and 4, small domes have been found in a triangular space at the corner of the *laternen-decke* (Figs 593, 598). Although this has not been seen so far in the *laternen-decke* on the Bamiyan Great Cliff, the idea of a small dome in the corner is verified in Cave B(d), Cave 35-II and Cave D, all of which have small domes engraved in the corners of their cross-vaulted

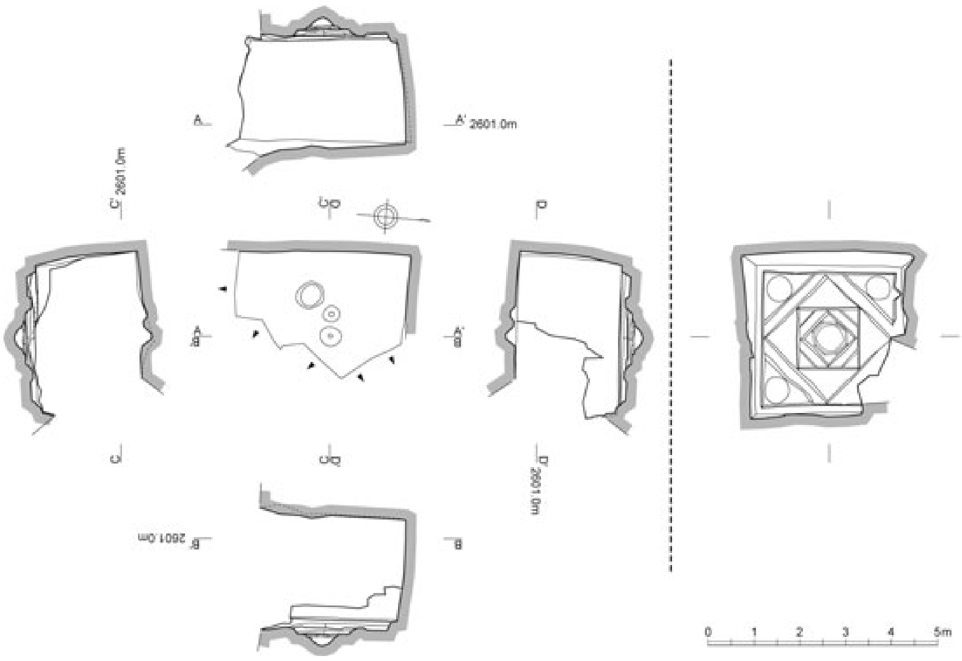


Figure 593 Foladi Cave 2: plan; section; ceiling (measured by PASCO Corporation, Japan, in 2005).

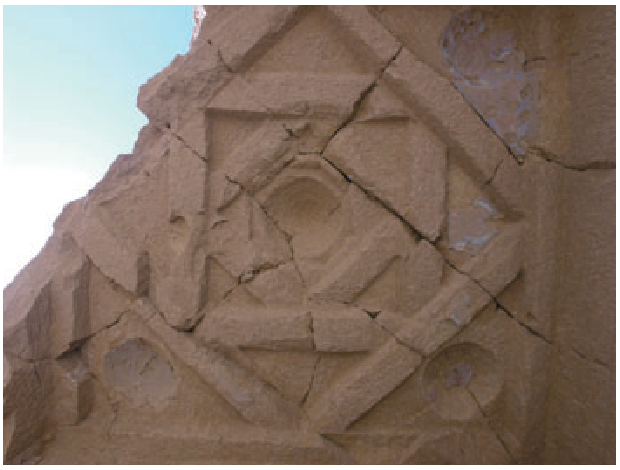


Figure 594 Foladi Cave 2: ceiling.

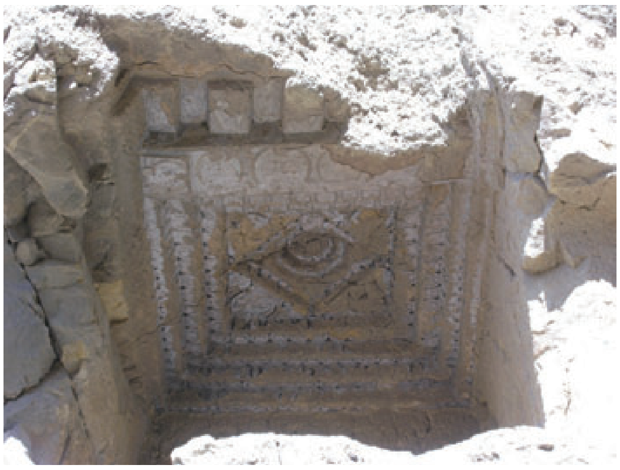


Figure 596 Foladi Cave 6: ceiling.

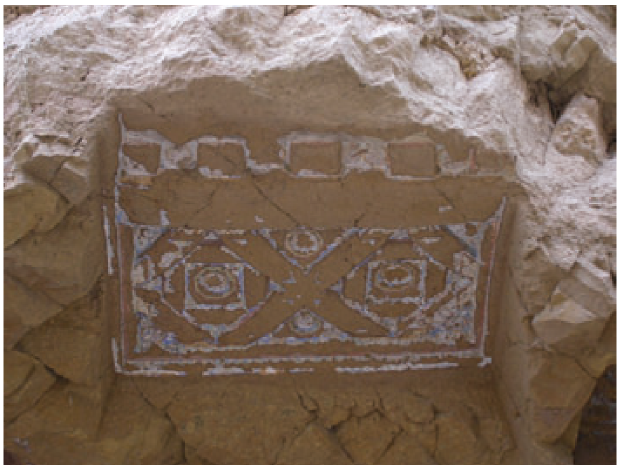


Figure 595 Foladi Cave 4: eaves.

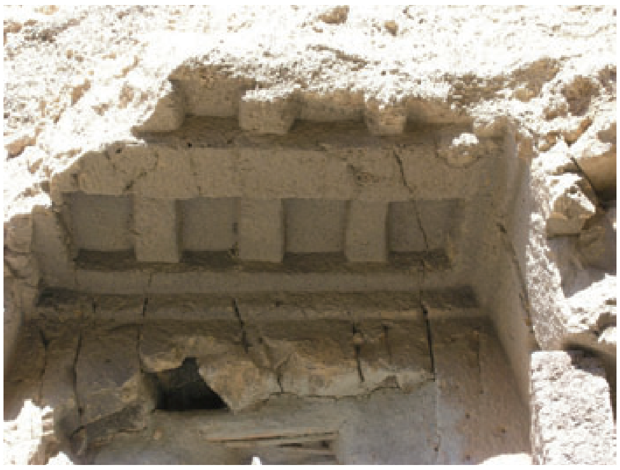


Figure 597 Foladi Cave 7: eaves.

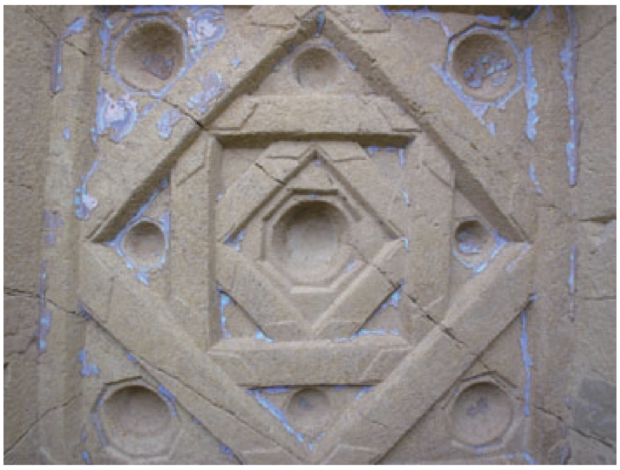


Figure 598 Foladi Cave 4: ceiling.

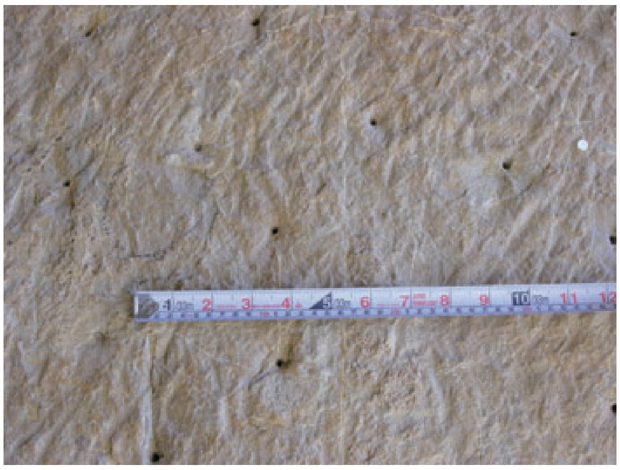


Figure 599 Foladi Cave 6: holes in the northeastern wall.

ceilings (Figs 271, 312, 360). These designs are not shaped with three-dimensional decorations made of rammed earth, but are directly chiselled out of the bedrock. The foundation around the Foladi Valley is more solid than that of Bamiyan, and this material would probably be fine-textured enough to be shaped in three dimensions.

The trace of chisel on the wall is homogeneous. On the walls of Caves 5, 6 and 7, there are still countless small holes less than 1 cm in diameter. It is assumed that they were designed to hold the wall clay (Fig. 599) and that they were created by an instrument with a poly-angular head. These relics show that the workers placed wooden tenons in the holes in order to form the clay wall. The finished surfaces of the caves in the Foladi Valley are simpler than those found on the Great Cliff in Bamiyan, possibly because of the homogeneous bedrock of the Foladi Valley.

Summary

To sum up, there are significant differences between the Buddhist caves in the Foladi Valley and those of the Great Cliff in Bamiyan. Radiocarbon dating performed in 2008 concluded that the mural paintings of the Buddhist caves in the Foladi Valley date from approximately the second half of the seventh century to the ninth century. This does not necessarily correspond with the results of previous studies. Nevertheless, it can be deduced that the Buddhist caves in the Foladi Valley would have been built after those in Bamiyan, which accords with the early studies.[1] This view is verified architecturally by the fact that the *laternen-decke* found in the Buddhist caves in Bamiyan, which date from around the seventh century, are also found in abundance in the Foladi Valley.

Note

1. Nishikawa (1964: 108) assumes that the Buddhist caves in the Foladi Valley could date back to the fifth or sixth century.

Chapter 6 Survey of the caves in the Kakrak Valley

Introduction

In the Kakrak Valley, southeast of the Bamiyan Valley, many caves and watchtowers are located on the western cliff facing the Kakrak River. The Buddhist caves of the Kakrak Valley are also part of the Bamiyan World Heritage site, and there are many notable caves with cave-niches and mural paintings. Kyoto University researchers examined the caves and watchtowers, and also reported on their plans and layouts (Nishikawa 1964, 1984). Recent research has shown that the Buddhist mural paintings in the Kakrak Valley, like those of the Foladi Valley, date back to the eighth century, making them relatively new among the Buddhist mural paintings of the Bamiyan Valley (Yamauchi 2006a). This visual observation focuses on the present condition of the caves in the Kakrak Valley, while still referring to previous research on the Buddhist caves in the Bamiyan Valley.

Overview of the Buddhist caves in the Kakrak Valley

The Buddhist caves in the Kakrak Valley stretch from the cave-niche at a height of about 8.3 m, and extend north and south along the cliff (Fig. 602). They have not been studied until now because they are not remarkable in terms of size and style. Nevertheless, the Giant Buddha viewed from the plateau on the opposite side was demolished into many pieces by the Taliban. We can only see an embedded rebar designed to support the head of a Buddha statue at the back of the niche (Fig. 604).

The Buddhist caves in the Kakrak Valley are scattered – not on a steep cliff, but on a folded ramp indented at its base (Figs 600–602). The surface is denuded and weathered, and therefore it is very friable. Almost all entrances to the caves and passages have collapsed or been destroyed, making it impossible to examine their accesses and the original spaces around the entrances. It is therefore difficult to draw up a conservation plan. In addition, there are many significant structural cracks in the bedrock.

Currently, the caves in the Kakrak Valley are uninhabited. Caves 42–45, aligned in a row, are currently closed for conservation. DAFA (Délégation Archéologique Française en Afghanistan) removed the mural paintings from Cave 43. On the whole, the caves in the Kakrak Valley are weathered and badly damaged, and their present condition is very grave.

Layout and form

In the Kakrak Valley, the caves are located on the folded cliff. The axis of the caves and the orientation of the entrances are inconsistent (Fig. 602). Many caves have a simple layout, such as a rectangular plan and vaulted ceiling. Only around the cave-niche, in the central part, can caves with distinctive forms be seen.

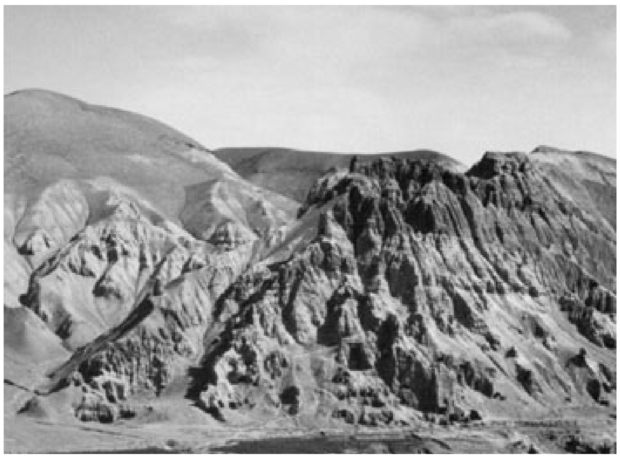


Figure 600 Kakrak Valley: 1970s (after Higuchi 1984) (courtesy of Kyoto University).

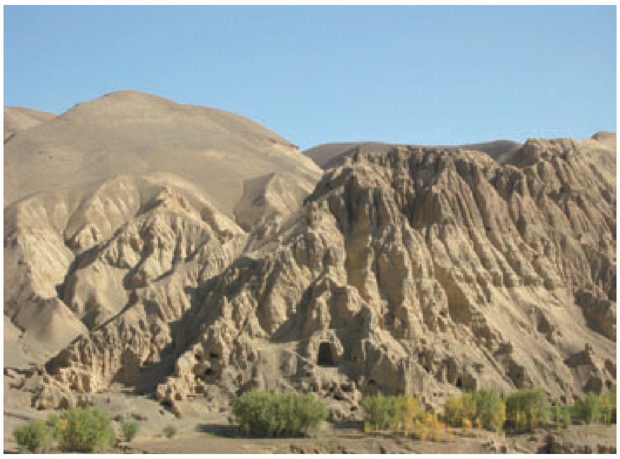


Figure 601 Kakrak Valley: 2006.

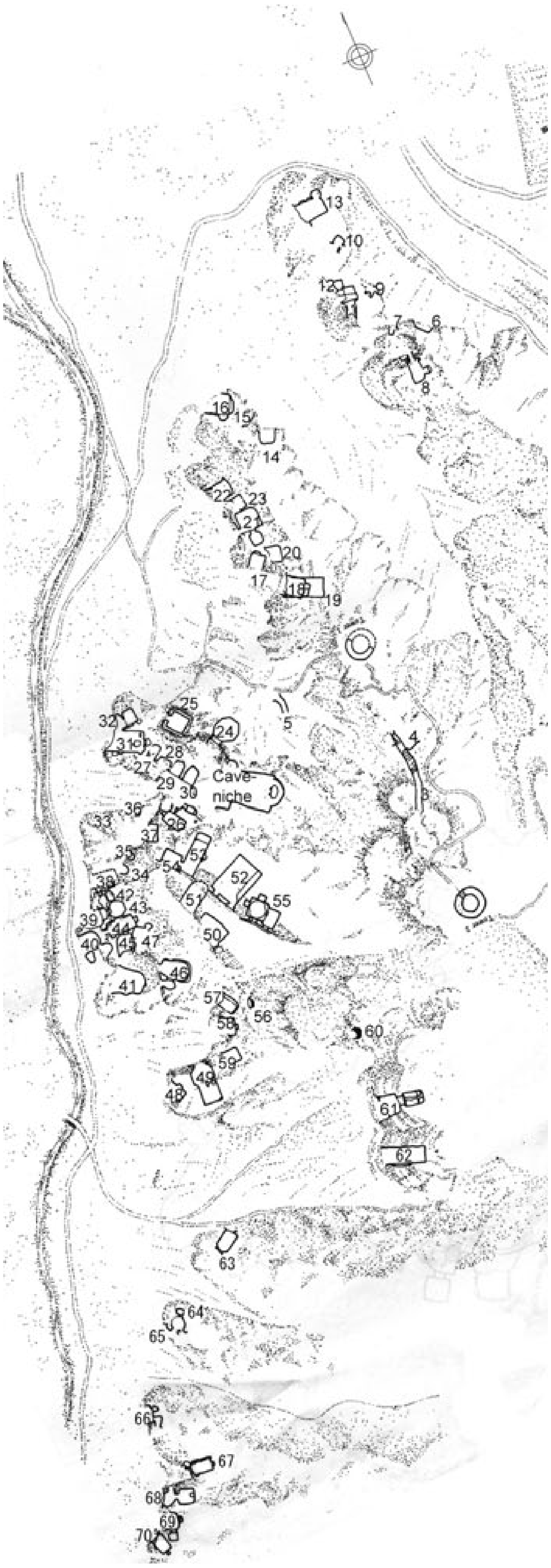


Figure 602 Buddhist caves in the Kakrak Valley: plan (after Higuchi 1984).

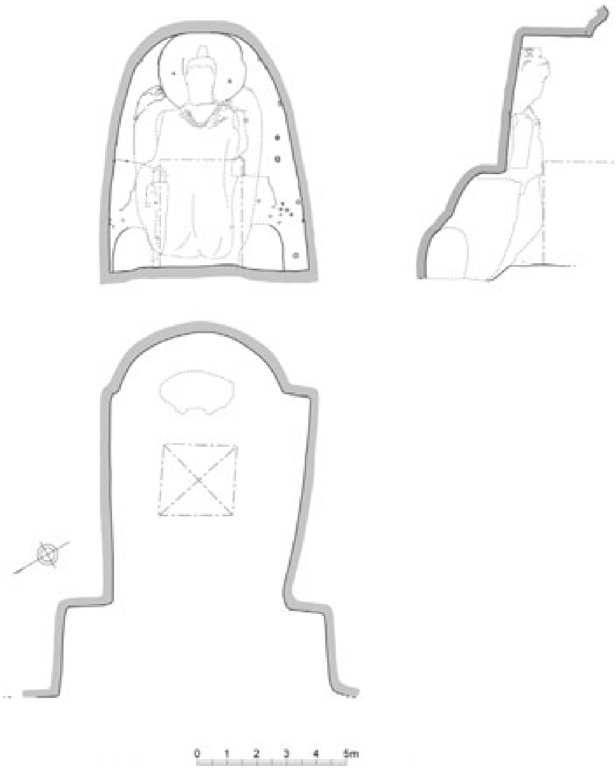


Figure 603 Cave-niche in the Kakrak Valley: plan; elevation; section (after Higuchi 1984).

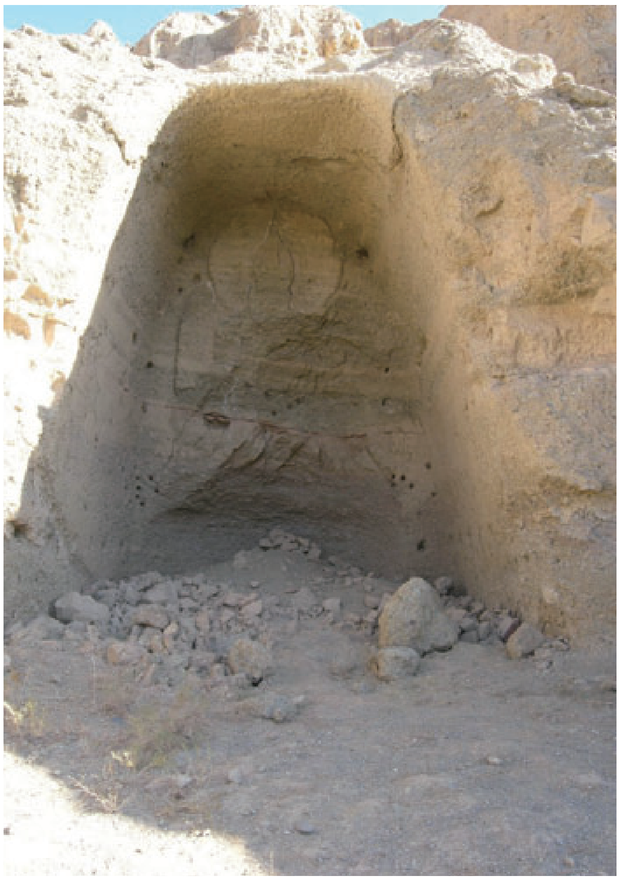


Figure 604 Cave-niche in the Kakrak Valley.

The cave-niche and the caves in its environs

The cave-niche measures about 6 m wide, 8.3 m high and 6.5 m deep. Before it was destroyed, the cave-niche contained a 1.7 m-high space for chanting on the right side at the bottom of the Giant Buddha (called *Unyodo*) (Figs 603, 604). In front of the cave-niche is a forecourt with a width of 8–9 m. It is impossible, however, to know its original size because its frontal area has collapsed.

Several caves are located near the cave-niche along the north and south rim of the forecourt. Cave 24 is to the north of the cave-niche and its entrance faces the forecourt of the cave-niche. This cave has an octagonal plan with a diameter of 4.5 m, a domed ceiling 4.8 m high, and a polygonal tambour at the junction. There are definite remnants of a trapezoidal doorframe with a lintel at the cave's entrance, even though it is unclear if this is an original feature of the cave (Fig. 606). An octagonal plan such as the one found in Cave 24 can also be found around the cave-niche on the Great Cliff in Bamiyan.

Cave 25, to the west of Cave 24, has a square plan and domed ceiling which is equipped with a squinch on the junction (Figs 608, 610). The entrance to Cave 25 does not face the forecourt of the cave-niche but instead faces northwest (Fig. 611). Previous studies had declared that this cave was the only superstructure in the Kakrak Valley made of mud brick. In this investigation, exterior and interior surfaces were analysed in order to determine whether the cave is built of mud brick.

First, we compared the exterior surface of Cave 25 with the bedrock surrounding the cave in order to ascertain if they are made of the same material. Second, we checked the interior surface from which the top layer of clay wall made from rammed earth has eroded. It was expected that this surface should indicate the basic structure of the cave. Figure 609 shows the exterior surface of Cave 25 from the right side of the cave front. This has been determined to be the same material as the bedrock around

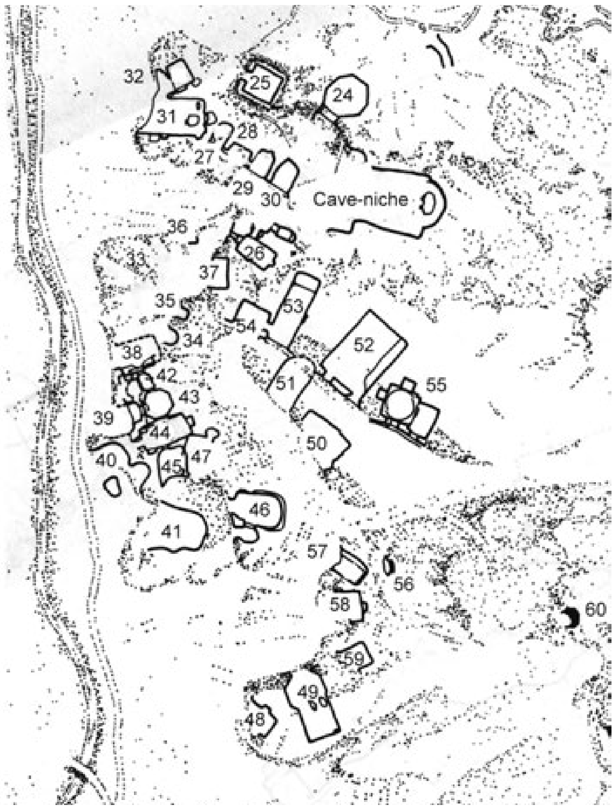


Figure 605 Buddhist caves in the Kakrak Valley: plan (around the cave-niche) (after Higuchi 1984).

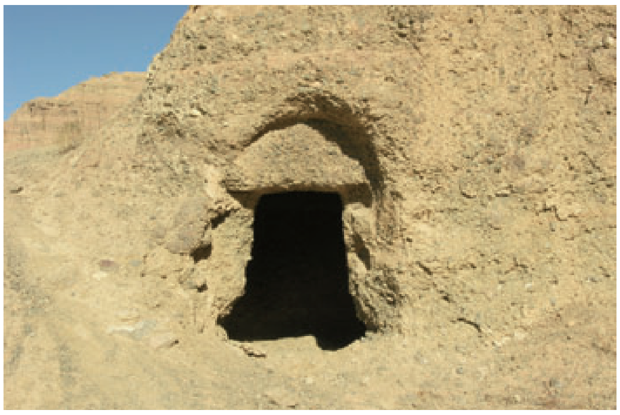


Figure 606 Kakrak Cave 24: façade.

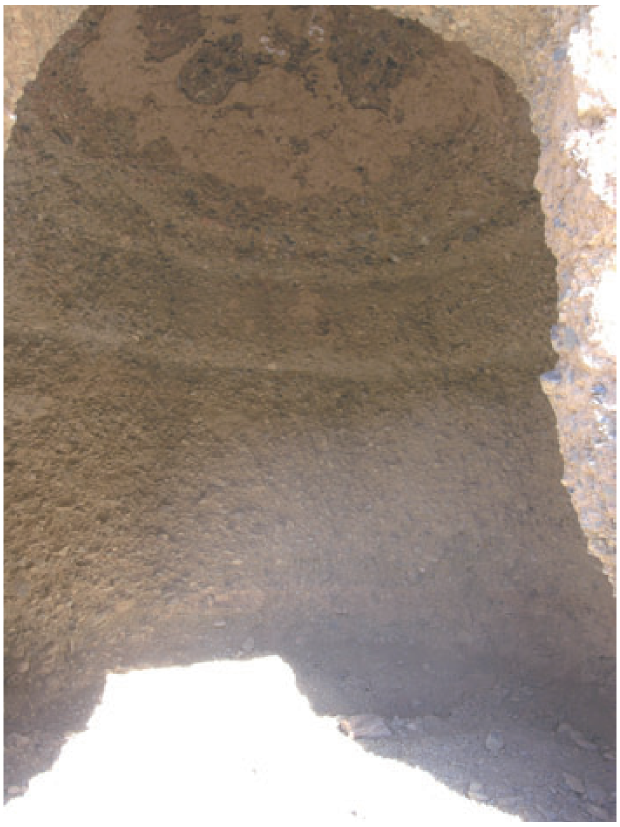


Figure 607 Kakrak Cave 24: northern side.

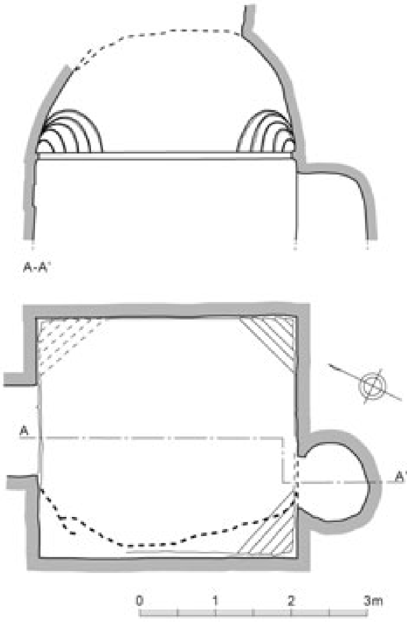


Figure 608 Kakrak Cave 25: plan; section (after Higuchi 1984).

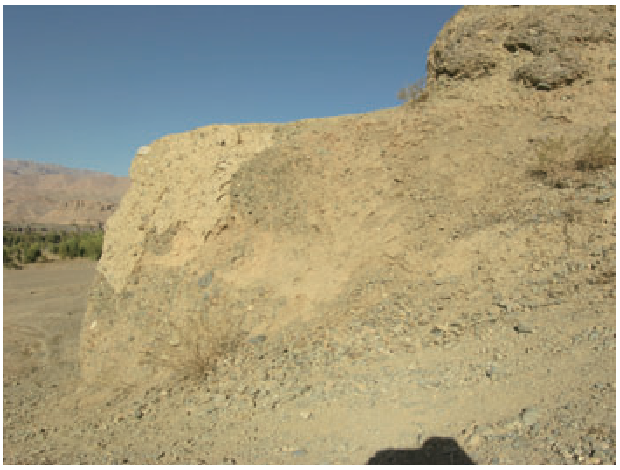


Figure 609 Kakrak Cave 25: façade of the front.

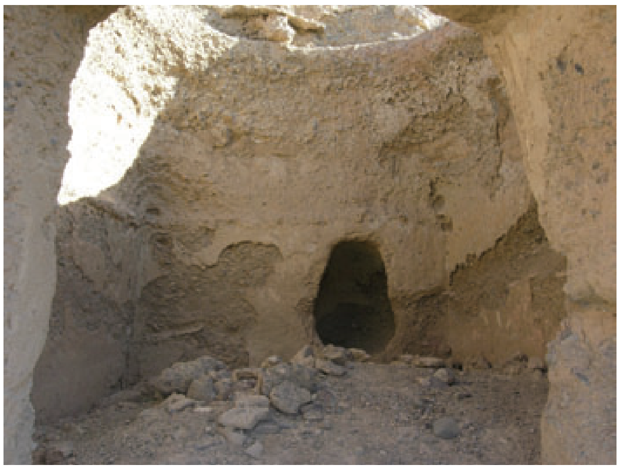


Figure 610 Kakrak Cave 25: southern side.

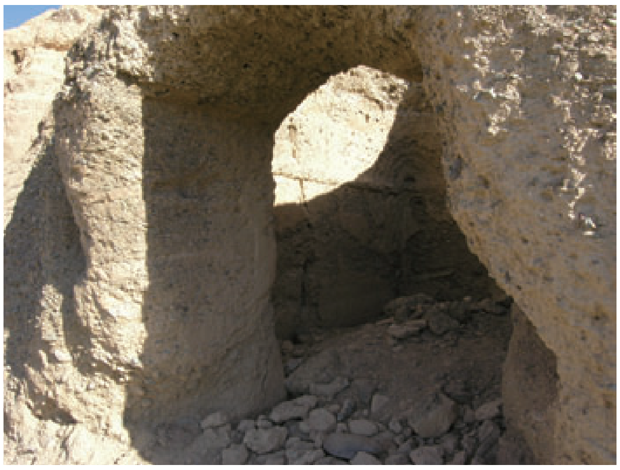


Figure 611 Kakrak Cave 25: entrance.

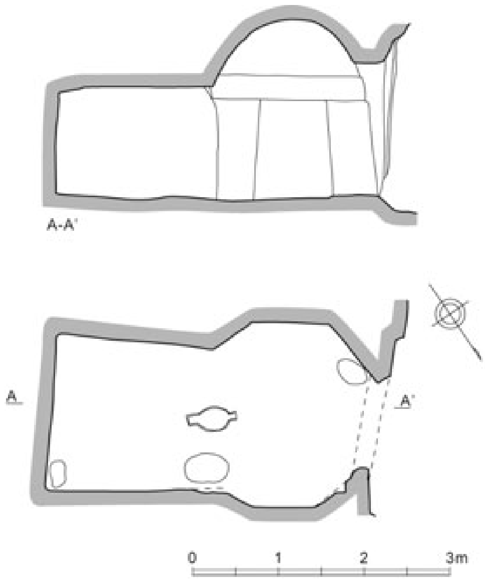


Figure 612 Kakrak Cave 49: plan; section (after Higuchi 1984).

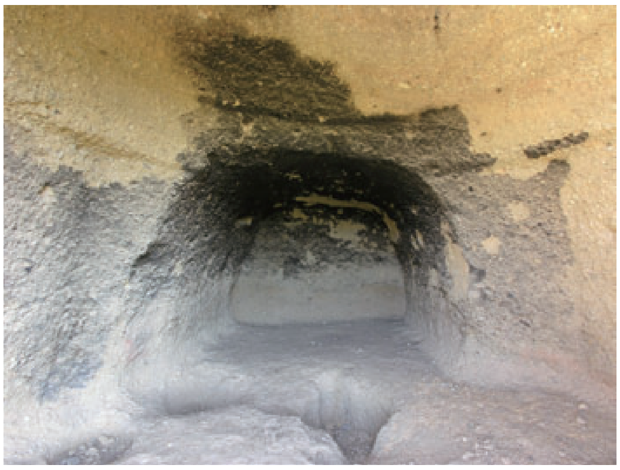


Figure 613 Kakrak Cave 49: southeastern side.

the cave. The upper left part of the surface in Figure 609 looks white, which is probably due to recent conservation work. Figure 611 shows the entrance at the front of Cave 25. The side walls have lost their top layers and the strata on the lower part of the wall possibly continue into the inside of the cave. As a result, it can be assumed that Cave 25 was not constructed of mud brick, but instead is a rock-cut cave. While the squinch and walls still retain some partial layers, the dome on the ceiling is almost entirely gone. This allows rainwater and meltwater into the cave, resulting in its current poor condition.

Cave 49, about 50 cm south of the cave-niche, is another remarkable case. The octagonal plan, more than 2 m wide, with a domed ceiling, is found beyond the entrance, at the back of which is a room with rectangular plan. The cave is only 4 m deep, but its layout is very interesting (Figs 612, 613). It is believed that this cave initially had an octagonal plan and was later enlarged into a rectangular space.

Other caves with the centred plan

There are a few caves with the centred plan in the Kakrak Valley. Cave 55 has the square plan and domed ceiling. Cave 43 features an octagonal plan, cornice and domed ceiling (Fig. 614). Both Cave 43 and the neighbouring Cave 44 originally contained mural paintings. These caves and those surrounding them were later connected. Each cave has its own entrance on the western cliff, which has now collapsed. These caves retain some mural paintings and are currently closed with mud bricks for conservation.

Radiocarbon dating with tempers was performed on Cave 43, which still retains Buddhist mural paintings. The results show that Cave 43 was constructed between the seventh and the eighth century. Although it is hard to precisely pinpoint the caves' construction dates, we can safely assume that the caves in the Kakrak Valley were formed almost at the same time as those of the Foladi Valley.

Summary

The caves in the Kakrak Valley are completely different from those of the Foladi Valley and the Great Cliff in Bamiyan. For example, no caves with square plans or three-dimensional decorations were found in the Kakrak Valley. There are only a few caves with the geometrically inaccurate, centred plan, and the orientations and axes are irregular. It is important to understand the reasons for these differences and assess the academic value of the caves in the Kakrak Valley, in the Bamiyan site, by dating and collecting more information on the cave-niche and caves. At the same time, a conservation plan for the Kakrak Valley must be provided as a matter of urgency from a long-term standpoint, as part of the Bamiyan World Heritage site. Opening the caves to the public is not recommended, however, because the cliff is highly fragile and there are very few safe pathways.

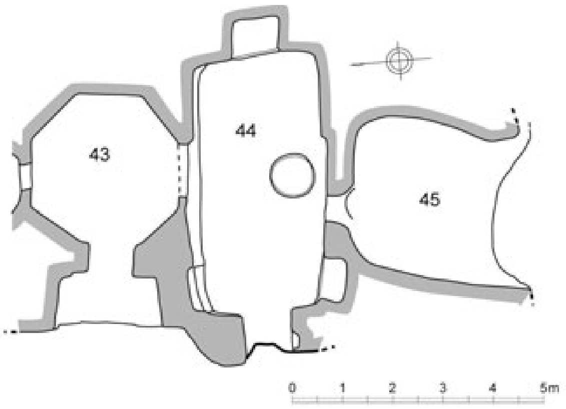


Figure 614 Kakrak Caves 43–45: plan (after Higuchi 1984).

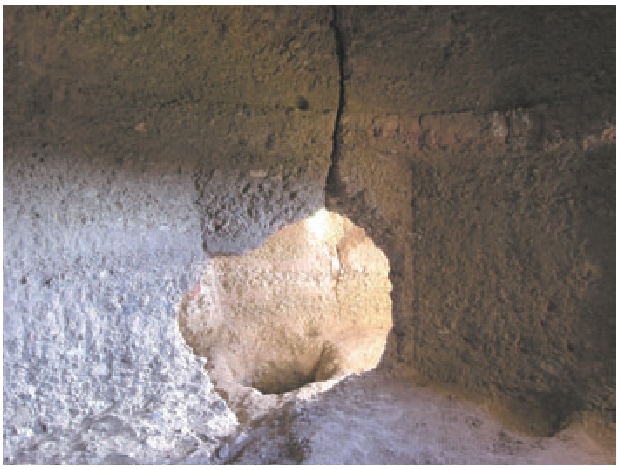


Figure 615 Kakrak Cave 43: southern side.

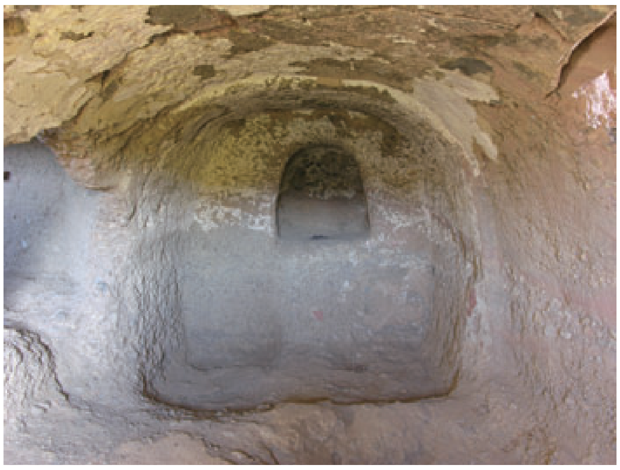


Figure 616 Kakrak Cave 44: eastern side.

Chapter 7 The traditional architecture

Overview

The Bamiyan Valley is situated to the south of the Bamiyan Great Cliff. There are several villages in this region and a number of traditional buildings are scattered among the region's many buildings, roads and fields. These conventional structures are crucial components for a deeper understanding of the landscape of the Bamiyan World Heritage site. RWTH Aachen University, in Germany, began investigating their distribution and current condition in 2004 (Aachen University 2005). It is further expected that these traditional buildings should retain the orthodox building techniques of the Bamiyan region, and therefore provide some hints for understanding their methods and characteristics of construction, in addition to the details of when and with what materials the structures were built.

The National Research Institute for Cultural Properties, Tokyo (NRICPT) and the Nara National Research Institute for Cultural Properties (NNRICP) executed visual observations on some of the traditional buildings as a preliminary investigation intended to enhance our understanding of the Buddhist caves. The former bazaar, Qal'a (a housing complex enclosed on all four sides), mausoleum and private houses were all examined (Fig. 617).

Architectural features

Former bazaar

The former bazaar stands on both sides of an old street stretching east to west, south of the West Giant Buddha (Fig. 618). These buildings consist mainly of the space on the road used as a bazaar, and a caravansary (accommodation for caravans). The bazaar is composed of a series of equally small square rooms, the entrances of which are located in the front of the building. The opening section of each room on this street features a segmental (bow-shaped) arch with mud bricks piled radially (Fig. 620). The sequence of these arches produces an arcade-style appearance.

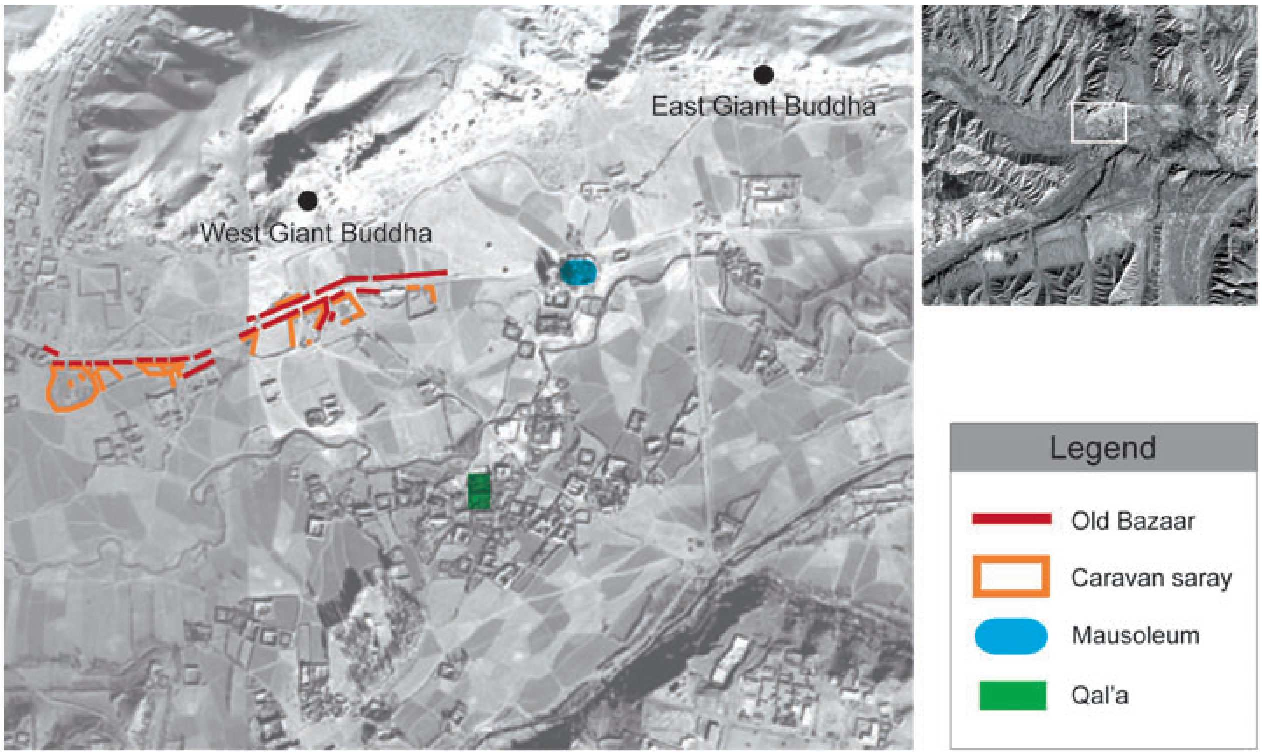


Figure 617 Distribution of the traditional buildings: West Giant Buddha, East Giant Buddha. Conventions: former bazaar, caravansary, mausoleum, Qal'a.

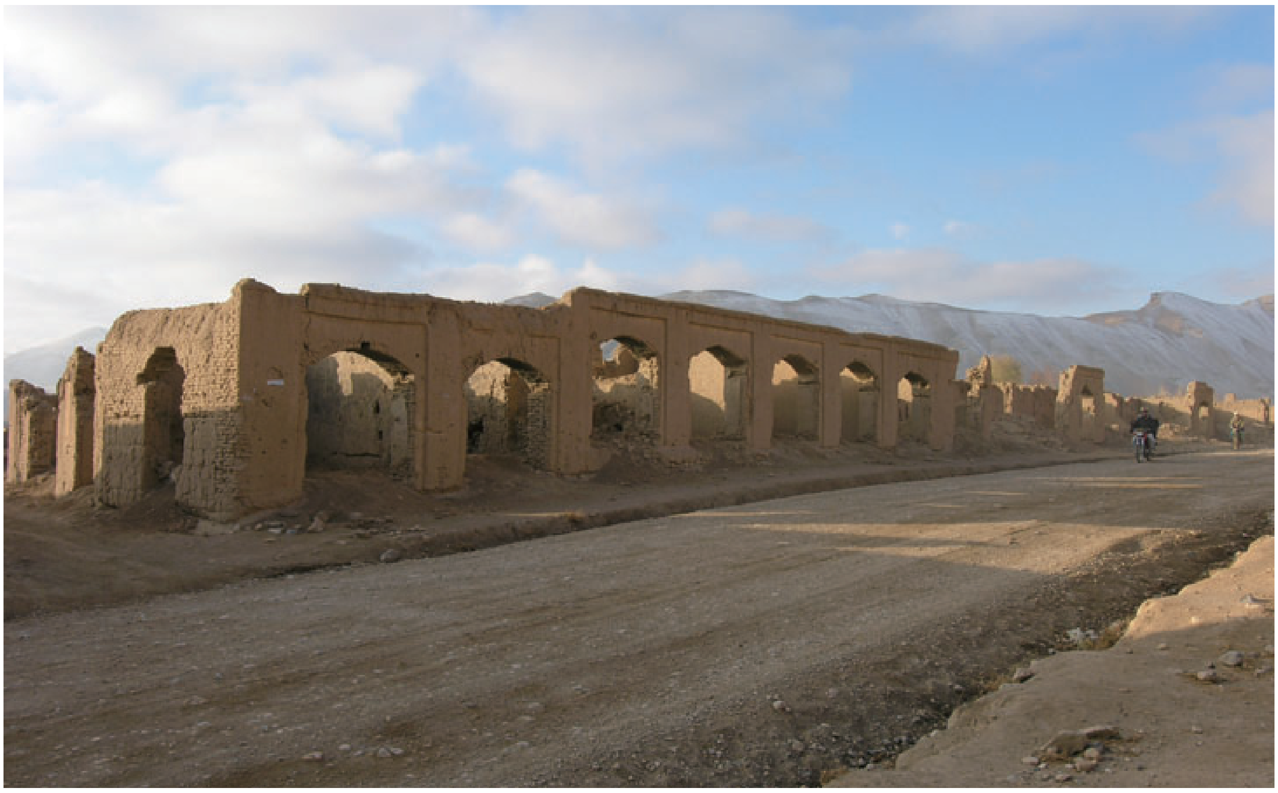


Figure 618 Former bazaar: southern side of the street.

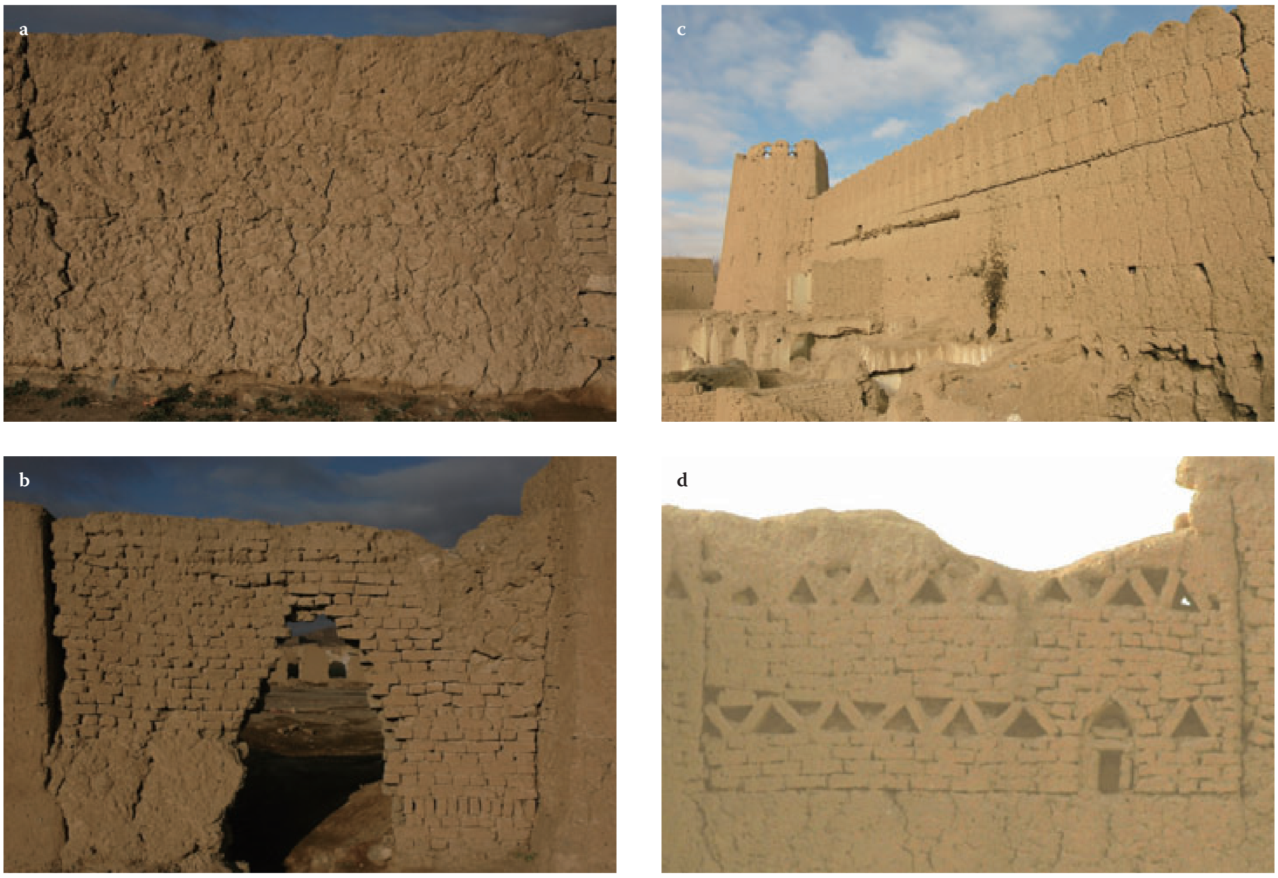


Figure 619 (a) Top layer (rammed earth, render); (b) wall of mud bricks; (c) wall of mud bricks with alternating stretching and bind courses; (d) wall of mud bricks with horizontally lined works of pyramidal-shaped decoration.

The masonry structure of mud brick was used for these buildings. On the foundations, there are cobbles around 15 cm in size. No roof structure has been confirmed, nevertheless it is reasonable to assume that the roof was not a dome but instead a flat wood ceiling, based on the fact that the top of the wall is horizontal and the wall would not have been thick enough to hold a dome. The mud brick walls are generally finished with a top layer made of rammed earth much like those of the other caves. Also, the segmental arches of mud bricks mentioned above have been recoated by rammed earth. It is therefore likely that these radially located mud bricks are not for decoration but were actually built to reinforce the structure.

There are several kinds of masonry structure techniques employed here (Fig. 619). In some cases, the workers piled mud bricks vertically; in other cases, they piled them obliquely. These are not reasonable methods from the viewpoint of construction. The surfaces of these walls have no top layers of rammed earth, which means that this technique should have been employed for ornamentation. It should be noted that the walls with these particular styles are found mainly on the sections that were restored later or established recently.

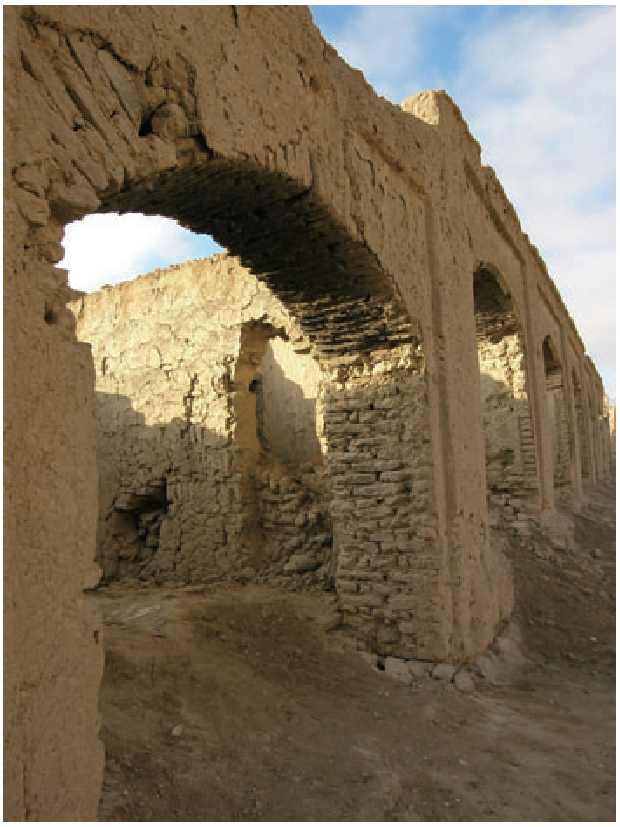


Figure 620 Arch above the entrance.

Qal'a

The Qal'a is a common architectural style in parts of West Asia, including Afghanistan. In Bamiyan, many housing complexes employ this method of enclosing buildings by a wall with towers at the four corners. Inside the confines of the wall there are spaces for a number of families and several courtyards (Fig. 623).

The towers at the corners have circular or polygonal plans, and incline to a certain degree towards the top (Fig. 621). This inclination is not just an illusion – it is clear from the remains revealed by a half-destroyed tower that the wall of the Qal'a itself is thinner at the top. This is also true of the tower wall (Fig. 622). Each layer has pillars and joists, and has a space in the shape of a niche between the pillars. The wall of this niche-like space contains a small window, which is supposed to be a crenel. Thus it is believed that the Qal'a functioned as a watchtower. The niches and pillars allocated on the wall are assumed to be devices that reduced the burden upon the walls and helped to create a robust tower structure. This method has been employed for masonry structures since the Roman era and is often found in structures made of bricks or stones, such as the Pantheon. We can safely say that a similar process was used for the other mud brick structures.

Logs and clusters of branches were used as joists above the niches, corridors and entrances. These joists made of timbers and natural woods were also utilised for tall buildings, such as the tower mentioned above, equivalent to a cornice in a stone structure. At the same time, they ultimately appear to divide the wall horizontally from a visual point of view. The ceiling of the living space and the floor of the stairs also used timbers as a stringer. Over rooms or spaces, logs act as joists, which are covered with branches and then rammed earth (Fig. 624).

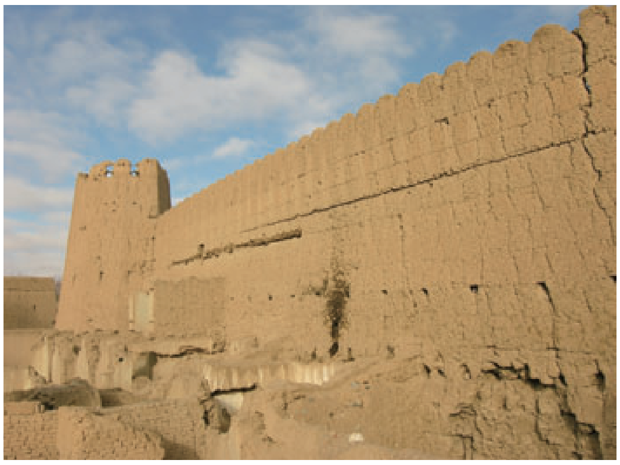


Figure 621 Façade of the Qal'a in Tolvara village.

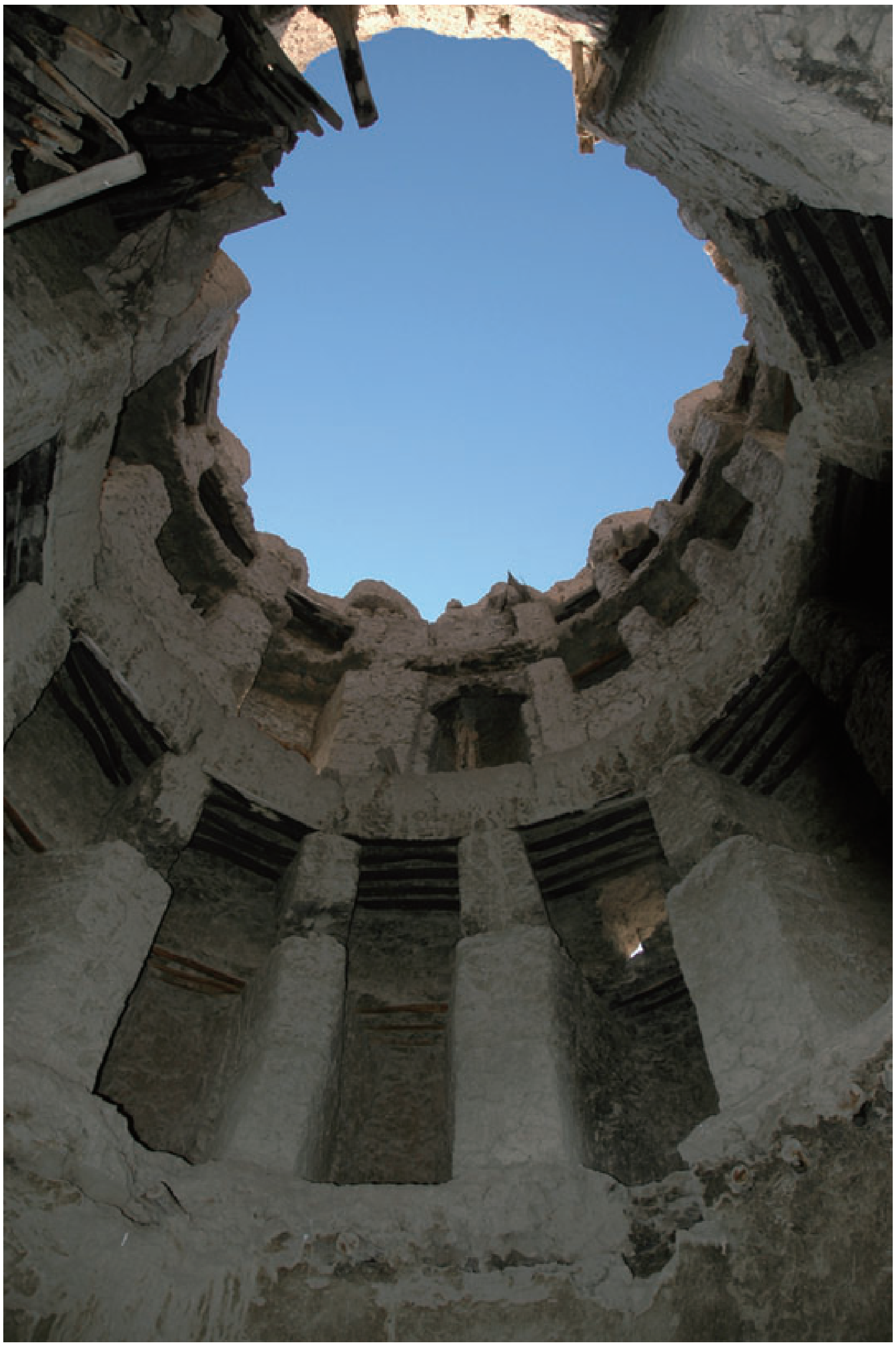


Figure 622 Inside of the tower of the Qal'a.

Mausoleum

The mausoleum, a destination for pilgrims, is located slightly to the south in the area between the East and West Buddhas. It is also on the street stretching from the bazaar. In the centre of the mausoleum, enclosed by a wall, there is a tomb with a nonagonal plan surrounded by a low partition (Fig. 625). Small structures and some graves are scattered around this tomb. The mausoleum, which is regarded as an important monument, could date as far back as antiquity. The structures in this region seem relatively new (Fig. 262) and reveal how the ceiling was constructed. Figure 627 shows that the ceiling and joists consist of logs of various widths. On the log joists are thinner logs utilised as joists, which were then overlaid with twigs. The ceiling was finally completed by coating it with rammed earth. This ceiling also seems to work as a floor for the space upstairs. This technique – thin

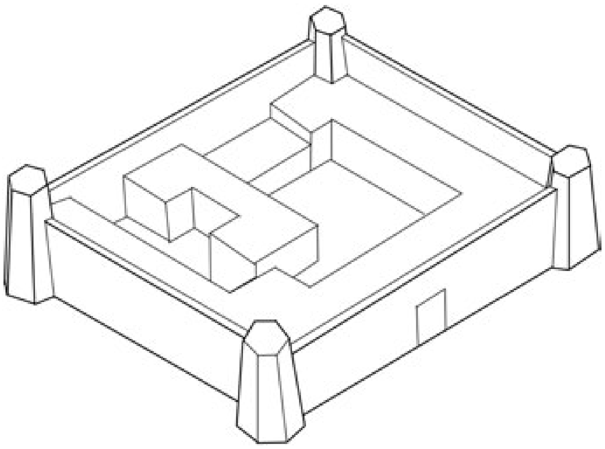


Figure 623 Reconstruction of the Qal'a.

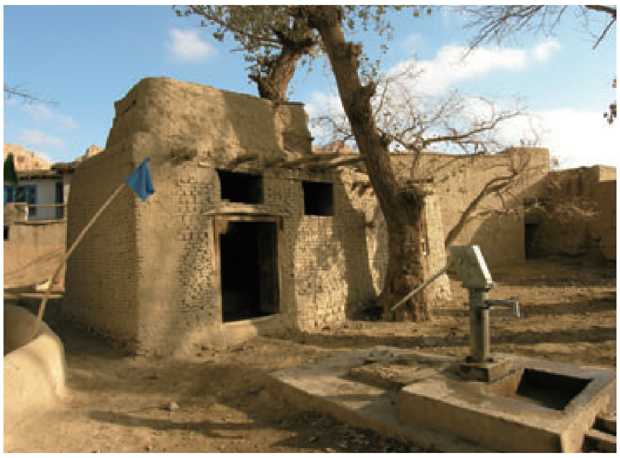


Figure 626 Structure in the precinct of the mausoleum.

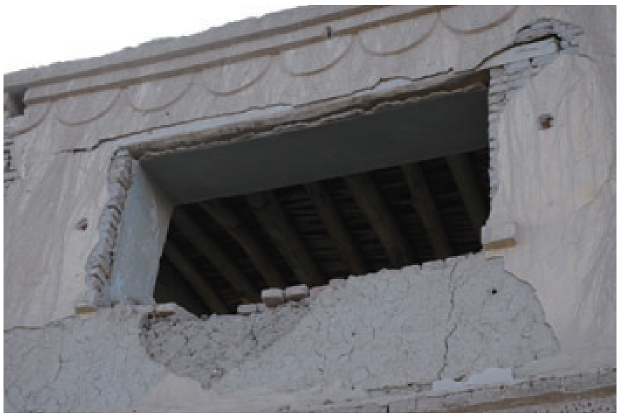


Figure 624 Ceiling with timbers.

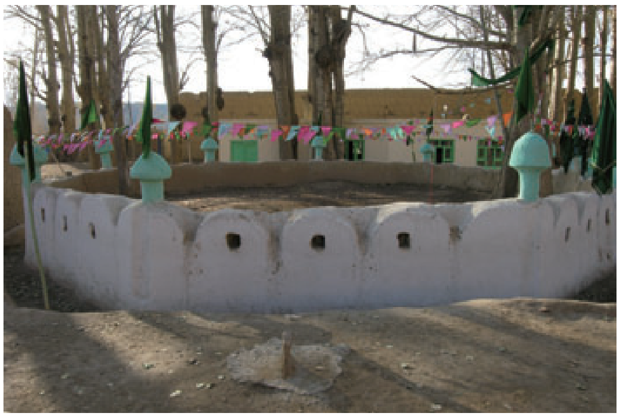


Figure 625 Mausoleum with nonagonal plan.

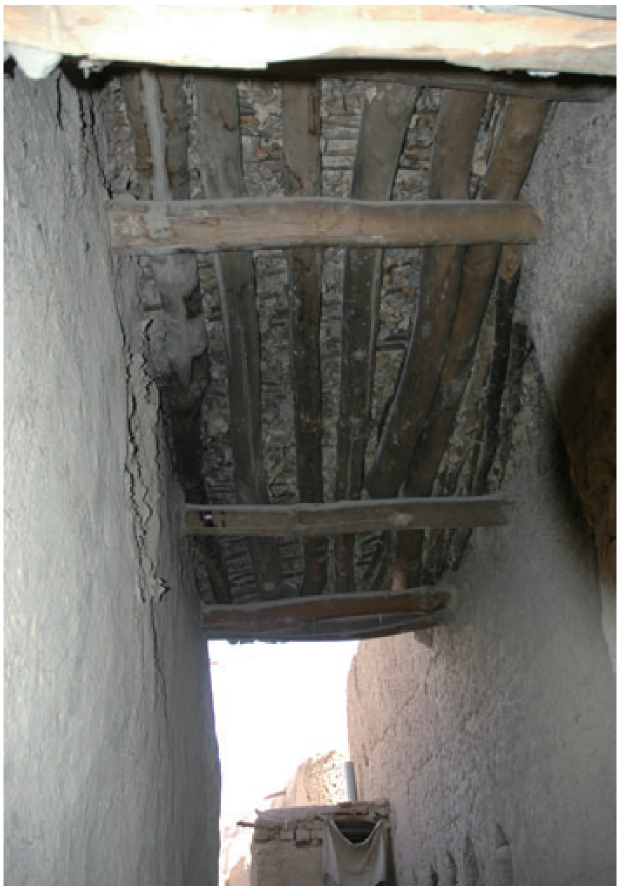


Figure 627 Ceiling with logs and twigs.

logs for a ceiling slab – was clearly employed for the tower's wall as mentioned above, and appears to have been a common method for creating a flat ceiling in the Bamiyan region.

Poplar trees in this region are aligned regularly and must have been planted schematically in relation to the mausoleum (Fig. 628). It is difficult to discern the pattern by visual observation alone; it is necessary to investigate the plan in order to understand the layout of the precinct.

Conservation

The traditional buildings in the Bamiyan Valley studied in this observation are crucial monuments, not only as components of the landscape of the Bamiyan World Heritage site, but also as invaluable samples for understanding conventional building techniques in the Bamiyan region. Nevertheless, their current condition is very poor. Needless to say, the superstructures constructed of mud

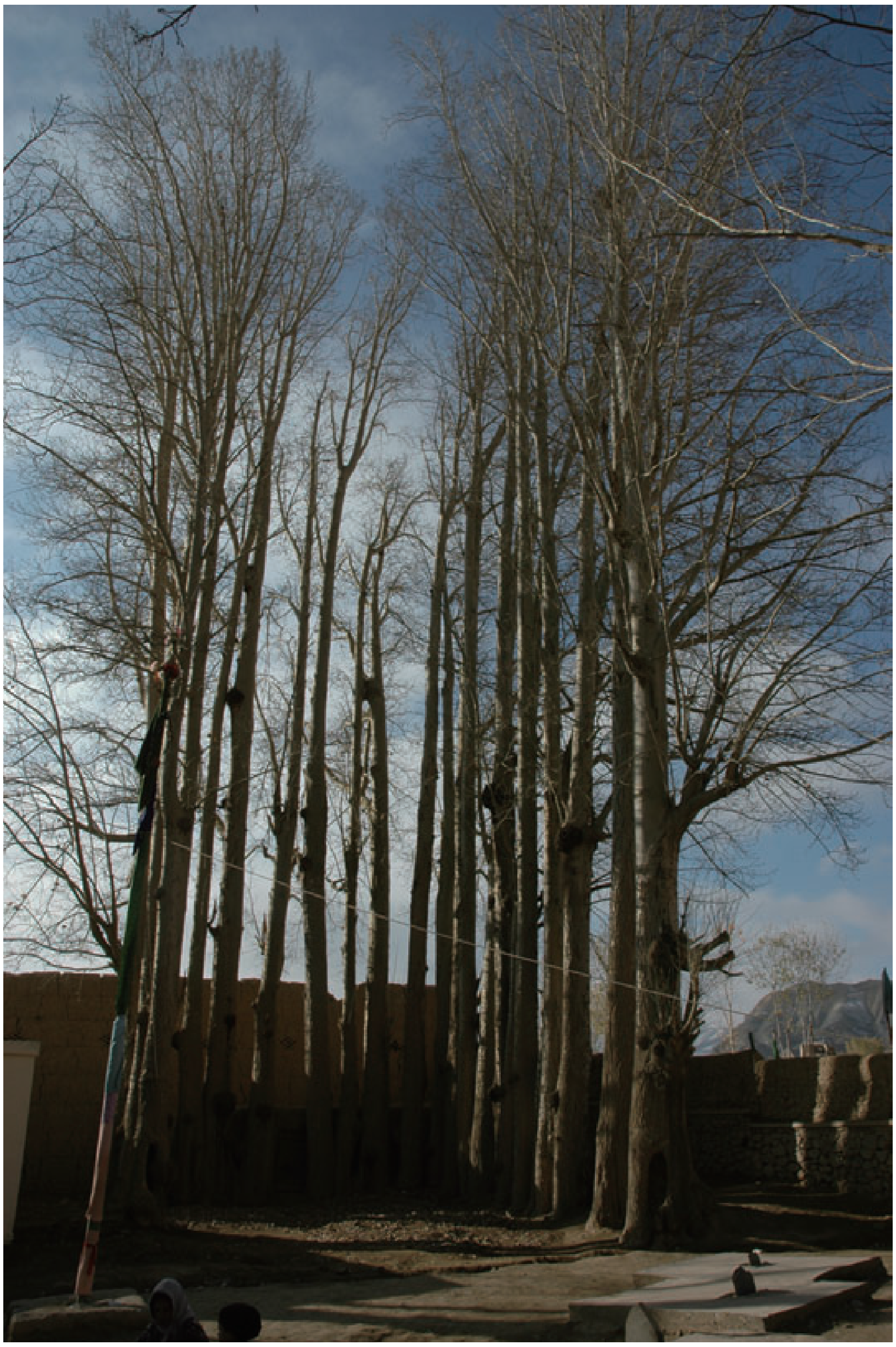


Figure 628 Systematically planted poplar tree colonnade.

bricks and rammed earth have been easily damaged to the point of degradation and collapse, particularly compared with the condition of the stone caves. Because of this weathering, some buildings do not receive the appreciation that they deserve. It is necessary to explore means of conservation for these traditional buildings as well as the stone caves.

In 2005, RWTH Aachen University researched the traditional buildings of the Bamiyan Valley and ultimately published the general information and inventories of these structures. It is still necessary to continually assess the individual monuments and encourage documentation projects, such as survey maps and state records, within the framework of conservation. These projects must include the traditional buildings.

Chapter 8 Architectural features of the Buddhist caves on the Bamiyan Great Cliff

Introduction

This chapter explains the architectural features of the Bamiyan Buddhist Caves including their form, layout, design, technique and chronology. Based on the results of visual observation, along with surveys of some of the caves, the chapter aims to highlight important elements that could aid future investigations of the caves. Future studies must comprehensively analyse the results of carbon dating and additional surveys of the caves in order to produce a detailed interpretation that includes chronology and an understanding of the original appearances of the caves.

Forms of the caves

The Bamiyan Buddhist Caves feature various types of forms. Previous studies have focused their categorisations on the plans and ceilings (Kodera *et al*. 1971; Kodera 1972). However, it is obvious from the examinations in 2005 and 2006 that the 'transitional part' should also be studied. As will be mentioned below, the transitional parts of the Bamiyan Buddhist Caves were inspired by several traditional architectural styles. Table 4 shows the many forms discovered in the Bamiyan Buddhist Caves and the most significant examples of each.

Plan

Both the centred and oblong plans were used in the Bamiyan Buddhist Caves, and the caves feature cave-niches for both standing and seated Buddha statues. The centred plan is a centralised plan, such as the circular, octagonal or square plan. There are a relatively large number of caves with this type of plan in the Bamiyan Buddhist Caves. It is generally very rare that structures as old as these retain intact ceilings therefore the caves with these ceiling plans in Bamiyan are invaluable for understanding centred plans from before the beginning of the Islamic era. With regard to the Buddhist caves, those with the centred plan have commonly been recognised as primarily religious, while the caves with the oblong plan are believed to be viharas. In Bamiyan, however, some caves with the oblong plan are lavishly decorated, such as Cave K3, which has a mural painting over the entire wall, and Cave XIV(a) and Cave N(h), both of which feature the large oblong plan. This suggests that the caves with the oblong plan were not always viharas.

There are no caves in Bamiyan with the chaitya plan (Fig. 629), often found in the caves in western India, or the vihara plan, which features many square rooms surrounding a central courtyard (Fig. 630). The centred-pillar cave frequently found in the Western Regions caves, such as the Kizil and Mogao Caves, in the centre of which a pillar is carved out, has not been found in Bamiyan either (Fig. 631).[1]

Ceiling

The caves with the centred plan feature a domed ceiling or *laternen-decke*, as well as a cross-vaulted or flat ceiling. The caves with the oblong plan were built with the vaulted ceiling or the flat ceiling, with some exceptions. The ceiling form is defined by the architectural plan, which is also reflected in the caves. The various ceiling forms at the Bamiyan site are highly significant architecturally. The following section summarises the features of each ceiling form.

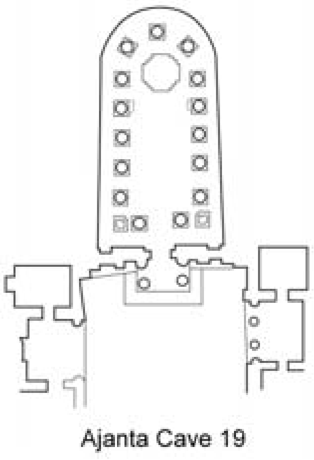


Figure 629 Chaitya plan.

Table 4 Typology of the Bamiyan Buddhist Caves.

Plan type		Ceiling type	Transition part	Example of caves
Centred plan	Square	Dome	Polygonal tambour	35-III, 53-IV, East V(a), T, U
			Cornice (+ tambour)	XIV(a), A upper (c), B1(c)
			Cornice only	East III
			Squinch arch (in tambour)	35-IV, 35-V, A lower (a), A lower (b), B(a), B(f), E(e), J(g), East VI (a), 48
			Squinch arch (in dome)	F1(a), G
			Corbel	V(c), E(j), J(c) ,J(b) ,J(d), 137
			None	53-VI
		Laternen-decke	None	53-V, F(c), F1(b), F3(f), F3(g), H(b), N(a), V(d), S(a), XV(b), XV(c), XIII(c)
		Flat	None	F3(a), J(e), J(f), M
	Octagon	Dome	Polygonal tambour	53-III, S(b), S(e), S(h), East II, East IV(a)
			Cornice (+ tambour)	53-I,53-II, F(a), XI,52
			Cornice only	53-VII
			Corbel	Z1
		Laternen-decke	Polygonal tambour	35-I, A upper (a), L, R(b), East I(a)
			Corbel	O(a)
		Cross-vault	Polygonal tambour	35-II
			Cornice (+ tambour)	D
	Circle	Dome	Cornice (+ tambour)	C(a), C(b), D1, XII(d)
			Other	
Oblong plan	Rectangle	Flat		XIII(a), XIV(a), XIII(a), B1(a), E(b), E(f), E(g), F(b), P(b), N(d), N(i), N(h), O(b), Q(a), Q(b), Q(c), East V (c)
		Vault		E(c), E(k), K3, N(c), N(f), S(c), S(l), R(c), R(e), R(a), V(a), Z(a), XIII(b), East V(d), East IV(b), XIV(a)
		Cross-vault		B(d)
		Other types		134
Cave-niche				I, H(a), E(c), J(a), 50, XII(b)

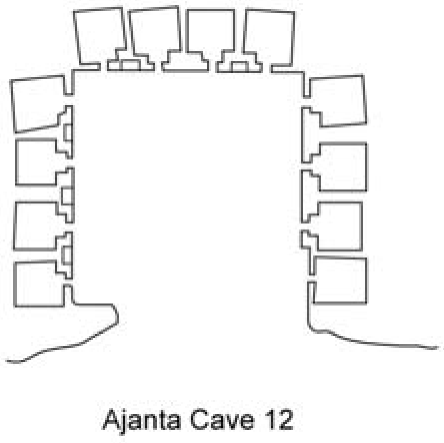


Figure 630 Vihara plan.

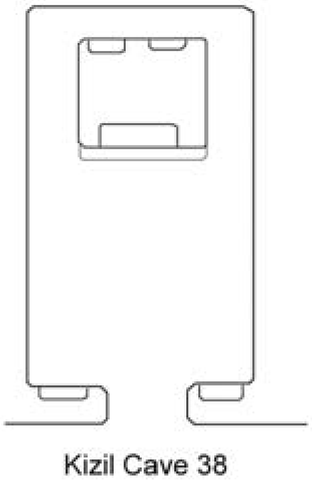
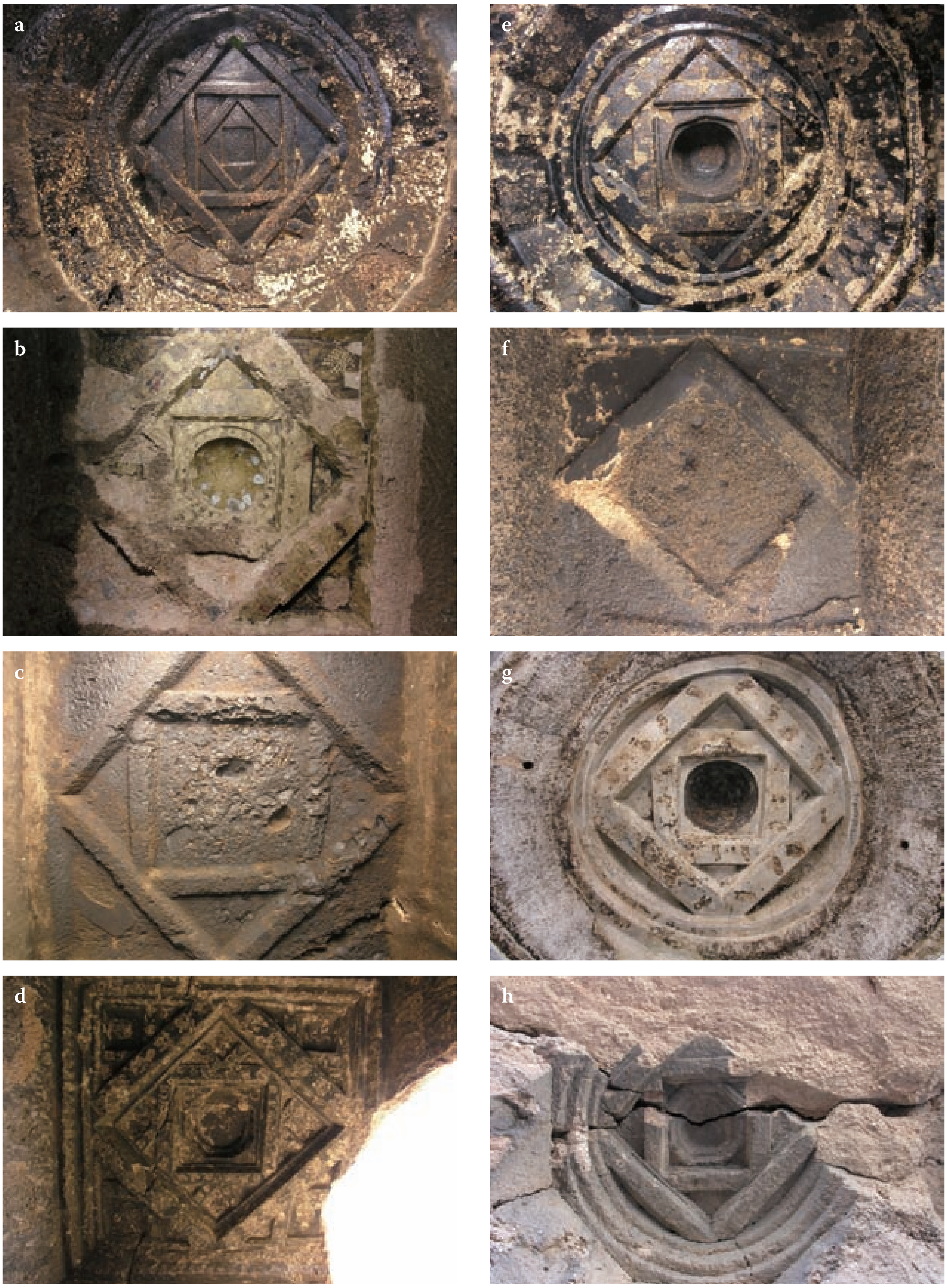


Figure 631 Centred pillar cave.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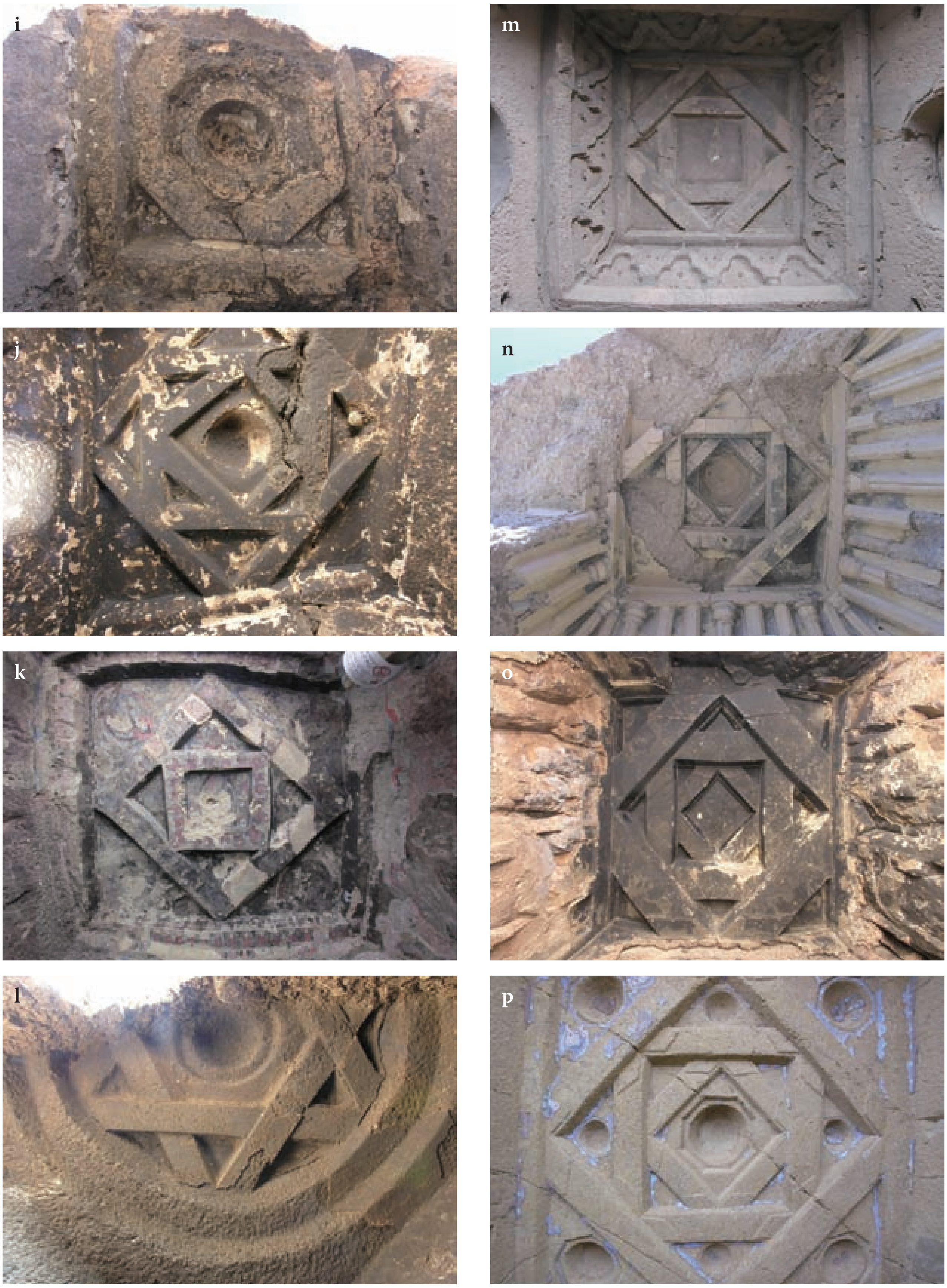
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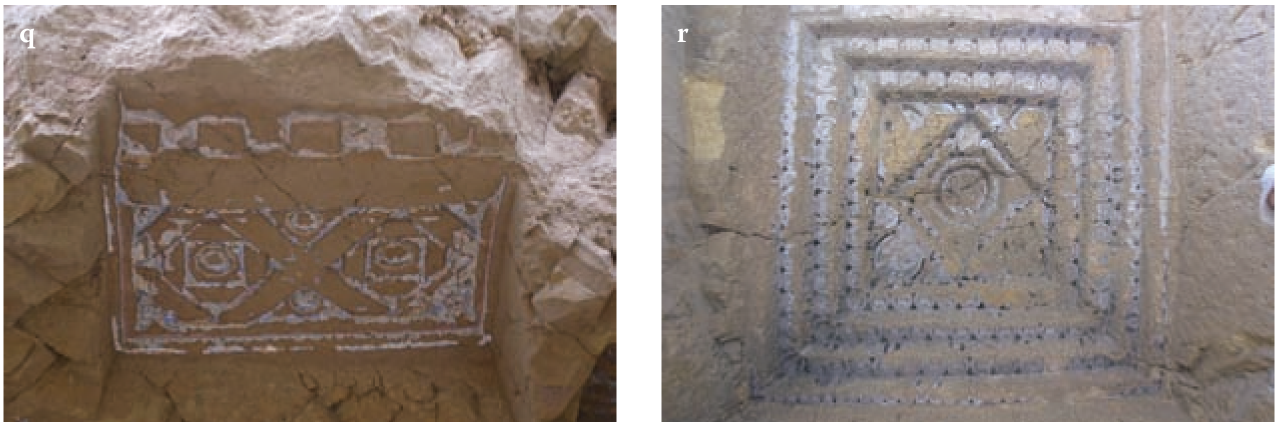


Figure 632 *Laternen-decke*: (a) I(a); (b) F(c); (c) F1(b); (d) F3(g); (e) L; (f) 123; (g) A (a); (h) 35-I; (i) S(f); (j) H(b); (k) N(a); (l) O(a); (m) 53-V; (n) XV(b); (o) XIII(c); (p) [copy to follow]; (q) [copy to follow]; (r) [copy to follow].

Laternen-decke (Fig. 632)

The *laternen-decke* consists of joists or plate materials that are piled up at a 45-degree angle towards each other. As the upper joist or plate material must be smaller than the lower material, the structure itself narrows as it rises to the top. The *laternen-decke* is made of plate-like stones or pieces of wood. By the seventh century, this form was employed widely on the Eurasian continent, from the Korean Peninsula in the east to the East Mediterranean Basin in the west, and both caves and ceiling paintings featured this particular form. It is believed that the wooden joists found in Bamiyan imitate the wooden structures found in places from Armenia to Gandhara. In Bamiyan, the *laternen-decke* is normally applied to a relatively small cave with a square plan. Even though Cave L has an octagonal plan, a polygonal tambour allows this cave to also have a *laternen-decke*. Some caves, such as Cave XV(b), have a three-dimensional *laternen-decke*, and others were built with the *laternen-decke* carved in two dimensions (such as Cave N(a)).

There are various types of *laternen-decke* in Bamiyan, depending on location. In the eastern side of the Bamiyan Great Cliff, near the East Giant Buddha, only caves in clusters sharing a forecourt feature a *laternen-decke* (Cave East I(a), Cave F1(b), Cave V(d), Cave 85, Cave 123 and Cave 136). The caves to the west of the West Giant Buddha have high ceilings relative to their floor size, and none of their front rooms remain (Cave XV(b), Cave XVI(b) and Cave XIII). The Foladi Valley has a high percentage of caves with the *laternen-decke* – it was employed for adjacent caves here, and the original inspiration for the structure is evident. In the Bamiyan Valley, only two adjacent caves, to the west of Caves F3, feature the *laternen-decke*. In the Kakrak Valley, no *laternen-decke* has been discovered.

As for the inspiration for the *laternen-decke*, in addition to the previously mentioned Cave N(a), Cave F3(g) and Cave XV(b) have shallow joists carved out in a possible corbel shape and derived from actual wooden structures at the end. Cave F3(g) and Cave East I(a) are attached with dog-leg parts on the exterior of their lowest joists. They are believed to be the corbel or *goubuchi* of *goutenjou*. The corbel indicates that the *laternen-decke* in Bamiyan originated from these wooden structures.

Cave 167, in the Kizil Caves in China, features a three-dimensional *laternen-decke* similar to that found in the Bamiyan site, and is decorated with mural paintings on the corbel section, just as in Bamiyan. The ceilings of the Mogao Caves in China feature many two-dimensional paintings of inspired *laternen-decke*. In the case of the Giant Buddha with a wooden-domed ceiling (Cave 96), the 'zǎo-jǐng ceiling' is comprised of angle braces that create a triangular space, along with more joists towards the top of the cave (Fig. 633). Some Buddhist caves from Bamiyan were built with the *laternen-decke* carved with a small dome at the centre, indicating a connection with the zǎo-jǐng ceiling in China, dating from the Han Dynasty. The small dome was built on the ceilings of the Buddhist caves in the Foladi Valley during a later period, and therefore it can be said that the domes were used long after other ceiling designs were abandoned. At any rate, it would be unrealistic to design masonry construction ceilings with a dome on top of the *laternen-decke*, and it is nearly impossible from a structural perspective. These caves, however, which are particular spaces less in danger of collapsing because they are carved out of the bedrock, would make this type of construction possible.

Among the Bamiyan Buddhist Caves, the hexagonal ceiling comprised of two triangular joists (Cave O(a)) is very anomalous. This ceiling style has previously been explained as a variant of the *laternen-decke*. It seems, however, inconceivable to regard this peculiar style as just an alternative to the *laternen-decke.* It is necessary to collect and record other samples of this style for further discussion.

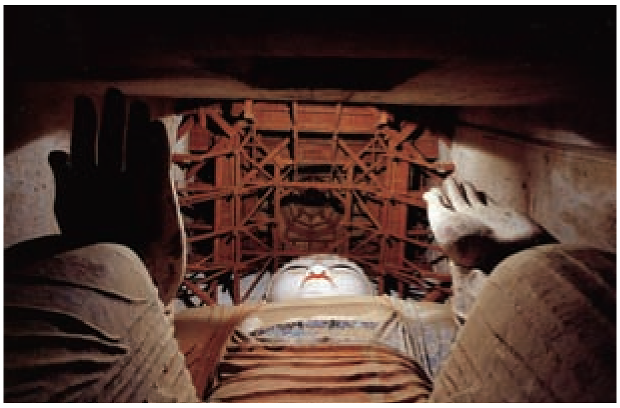


Figure 633 Mogao Caves in China: ceiling of Giant Buddha.

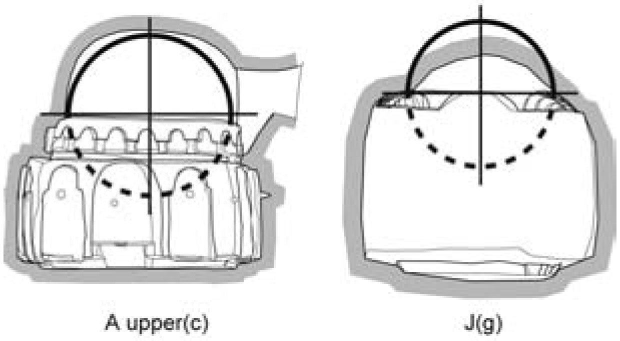
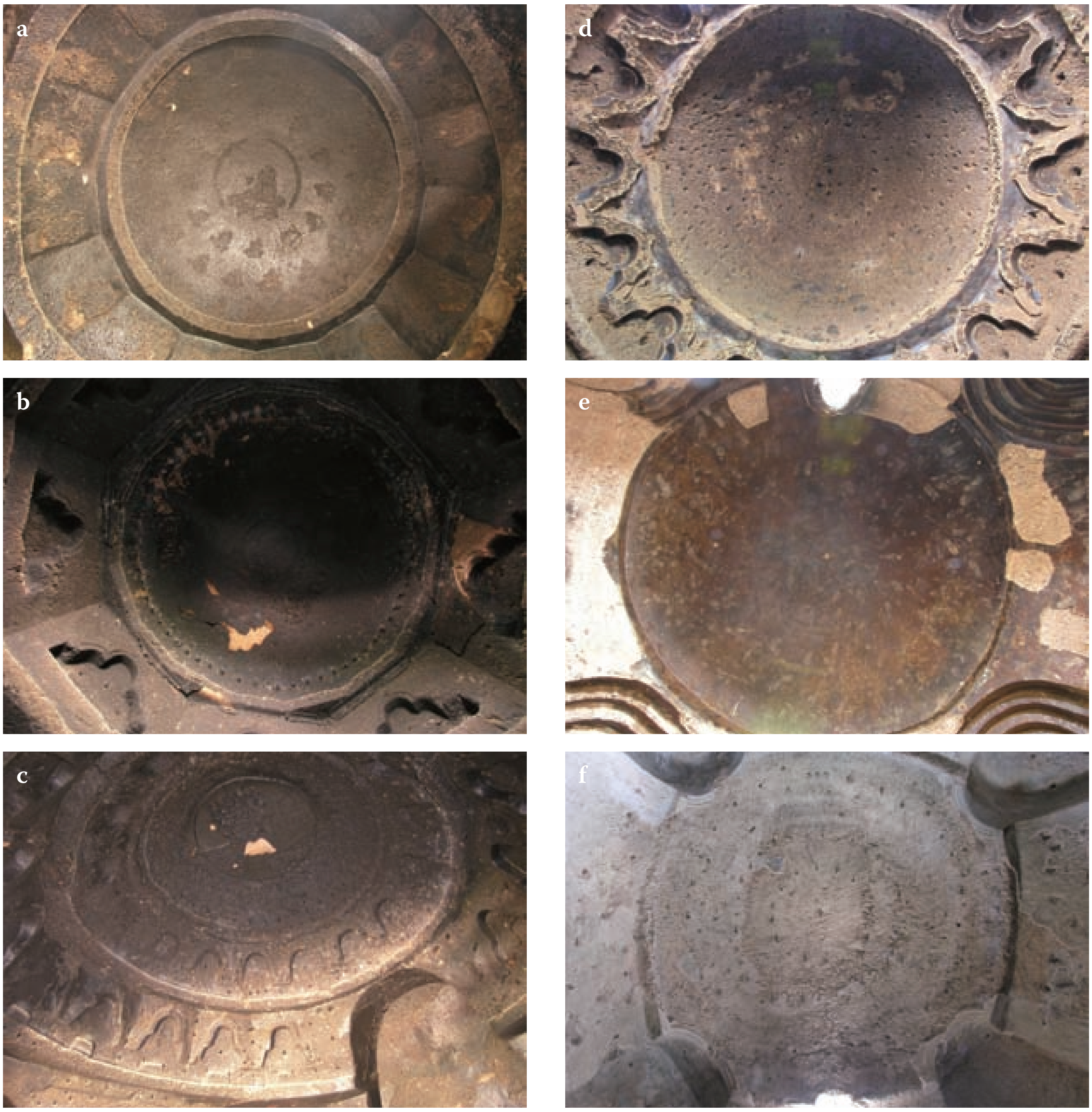


Figure 634 Section of dome.



Finally, it can be said that the structure and design of *laternen-deckes* in Bamiyan depend on their location. This style of ceiling will be crucial for understanding the chronology of the Bamiyan Buddhist Caves once more precise dates for their construction have been established.

Domed ceiling (Fig. 635)

The domed ceiling is the most popular form in the Bamiyan caves with centred plans. The size of the caves with domed ceilings varies from ca. 2 m to ca. 7 m. Some mural paintings remain on the domed ceilings and there are also three-dimensional decorations made by rammed earth on the ceilings in larger caves, such as Caves XI, T and U. Niches and bench-style pedestals are found in the caves with domed ceilings, inside or upon which statues would have been installed. Based on their layout, the richness of their design and the centripetal effect of the cave interiors, it is presumed that the caves with domed ceilings were of primary importance for religious activities.

The shape of the dome is normally almost a semicircle, however some are shallower (Caves F1(a), J(g), XI) and others are deeper (Caves A Upper(c), A Lower(a), B(a)) (Fig. 634). The difference in the proportions of the domes provides a sense of the different spatial impressions the

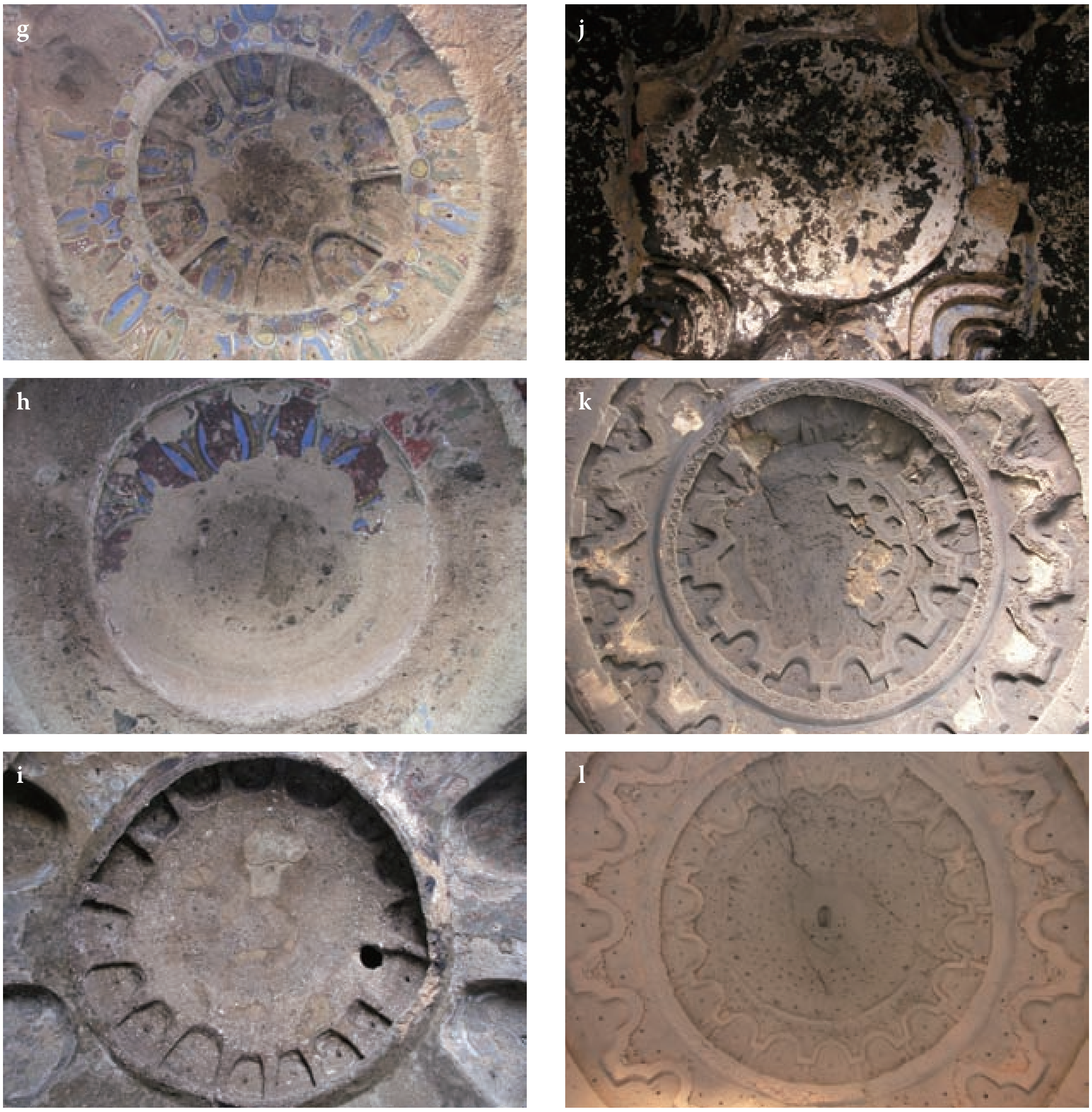


Figure 635 Domed ceiling: (a) IV(a); (b) U; (c) T; (d) F(a); (e) A(a); (f) Bi(c); (g) C(b); (h) C(a); (i) D1; (j) J(g); (k) XI; (l) 53-II.

caves produced. It will be necessary to continue surveying and documenting the caves in order to clarify whether the digging techniques in each period caused this difference, in addition to the issue of chronology.

Cross-vaulted ceiling (Fig. 636)

The cross-vaulted ceiling can be described as a domed ceiling with a flat top on which the cross-vaults are added, and can be found in caves such as Caves 35-II and D around the East Giant Buddha (Fig. 636a, b). At the centre of the dome, another small dome has been carved out. Another type of cross-vaulted ceiling, found in Cave B(d), is engraved in the shape of a small *laternen-decke* at the centre of the sculpted cross-vaults with trapezoid-shaped sections (Fig. 636c). Caves 35-II, D and B(d) share a common plan, although with minor differences, which features four small domes in the four spaces created by two crossed vaults. The meaning and function of this ceiling is unclear, but caves with this feature were placed around the East Giant Buddha.

Tests on the straw from the wall clay of mural paintings indicate that Cave D dates from the middle of the seventh century, and Cave B(d) dates from the late seventh to the early eighth century.

Vaulted ceiling (Fig. 637)

The vaulted ceiling is often employed in caves with a rectangular plan. Some walls in the caves with a vaulted ceiling also have one or two corbels facing inwards at the springs of the vaults (Fig. 637). Their height is similar to that of the corbels that segment tambours in the caves with the centred plan. Cave 3, which still contains mural paintings, has a horizontal band at the height of the vault spring that divides the side wall. This band also functions as a borderline between mural paintings with different motifs in the upper and lower wall spaces (Fig. 637a).

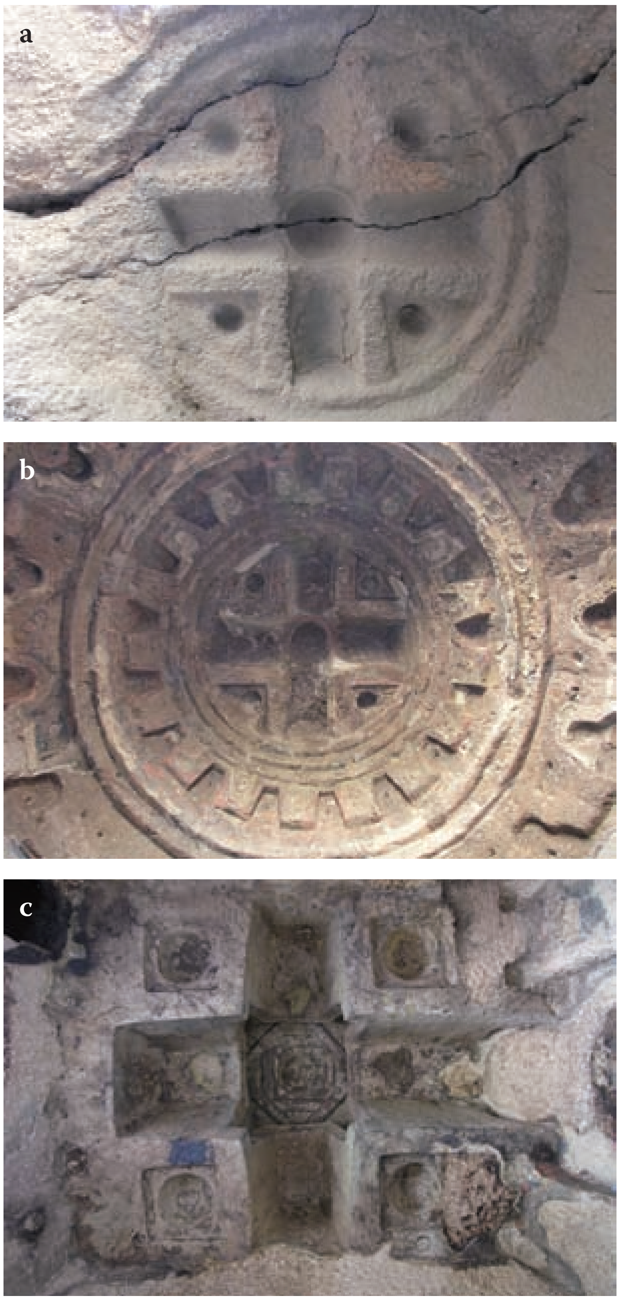


Figure 636 Cross-vaulted ceiling: (a) 35-II; (b) D; (c) B(d).

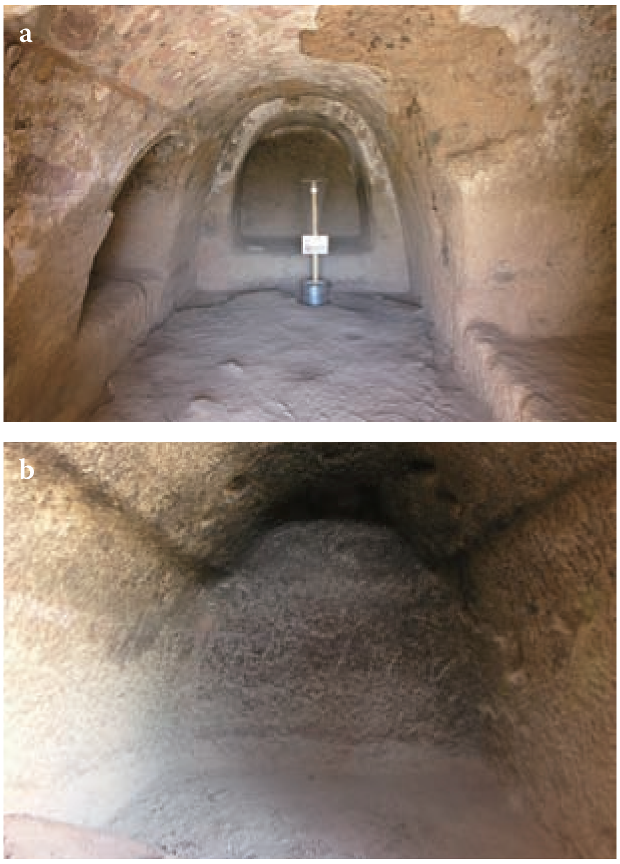


Figure 637 Vaulted ceiling: (a) K3; (b) N(c).

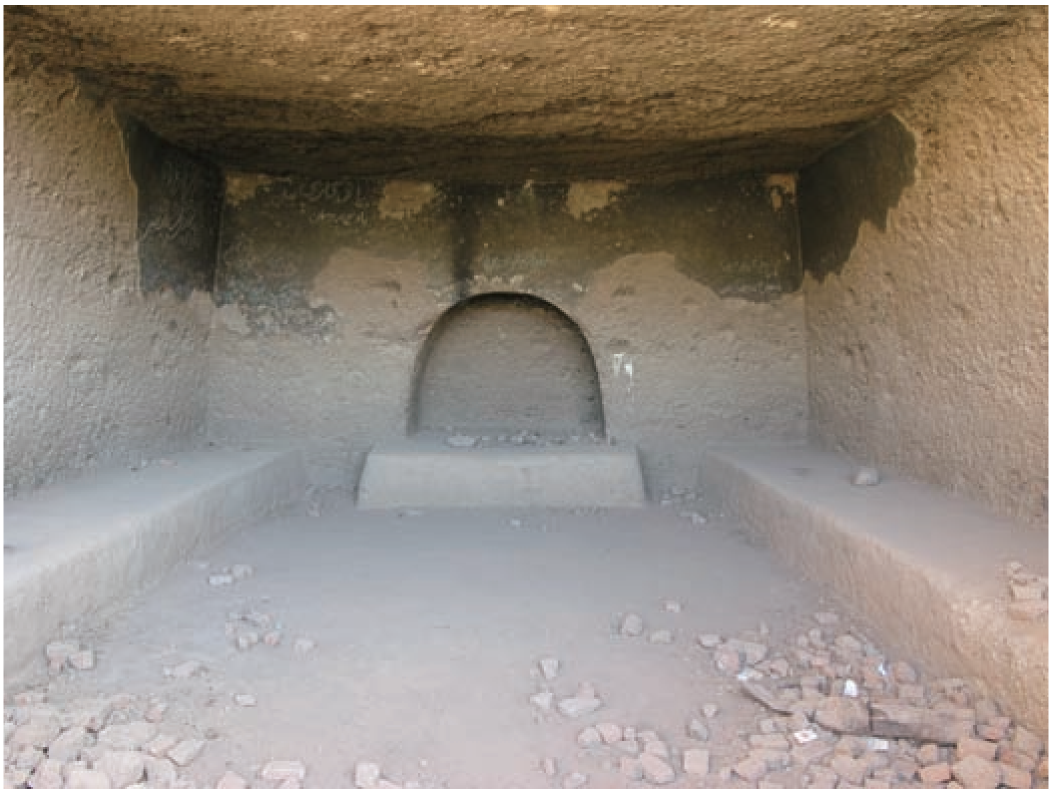


Figure 638 Flat ceiling: Cave XV(a).

Flat ceiling (Fig. 638)

Caves with the rectangular plan and flat ceiling are less common than those with the rectangular plan and vaulted ceiling. However, Cave M with a square plan and Cave 35-VII with a circular plan are rare examples of caves with these plans that also have a flat ceiling. Each cave has elaborate carvings often finished with wall clay and mural paintings. Many of the caves with a flat ceiling are small in size, which creates a greater feeling of pressure than in the caves with the vaulted ceiling.

Transitional part between wall and dome

In the caves with a centred plan, such as the circular, square or polygonal plan, there is a transitional section between the wall and the ceiling that connects the two components. The transitional section is an issue unique to masonry construction buildings. Since the domed structure first appeared many centuries ago, people from the Mediterranean to West Asia have tried to solve this problem. The transitional part built into the superstructure of buildings with a dome crucially bears the bulk of the thrust force generated by the dome structure.

The transitional device is one of the most significant features of the Bamiyan Buddhist Caves. Squinches, cornices and tambours play this role in Bamiyan, seemingly adopting the architectural tradition of domed buildings from masonry construction. It is very intriguing that such various skills were utilised for the construction of the Bamiyan Buddhist Caves. Compared to the Kizil Caves in China, which are similar in style to those of Bamiyan (square plans and domed ceilings), the transitional components between wall and dome in the Bamiyan Buddhist Caves are closer to the actual structure and contain a variety of expressions, in addition to being analogous with constructions on land.

It is noteworthy that evidence of the pendentive, which was employed for ancient buildings in Turkey and Syria, in the Byzantine architecture, and which has been a primary component of Islamic architecture, has not been found in the transitional parts in Bamiyan to date. The following section explains the characteristics of each style.

Tambour

The tambour is a cylindrical part under the dome. The Bamiyan Buddhist Caves feature two types of tambours: one divided by a corbel and the other by a cornice. Caves J and Cave A Lower(a), which date to the late fifth century according to the straw from the oldest wall clay, employ the former style (Fig. 639). The tambour connects the square or octagonal cave plans with the circular plan of

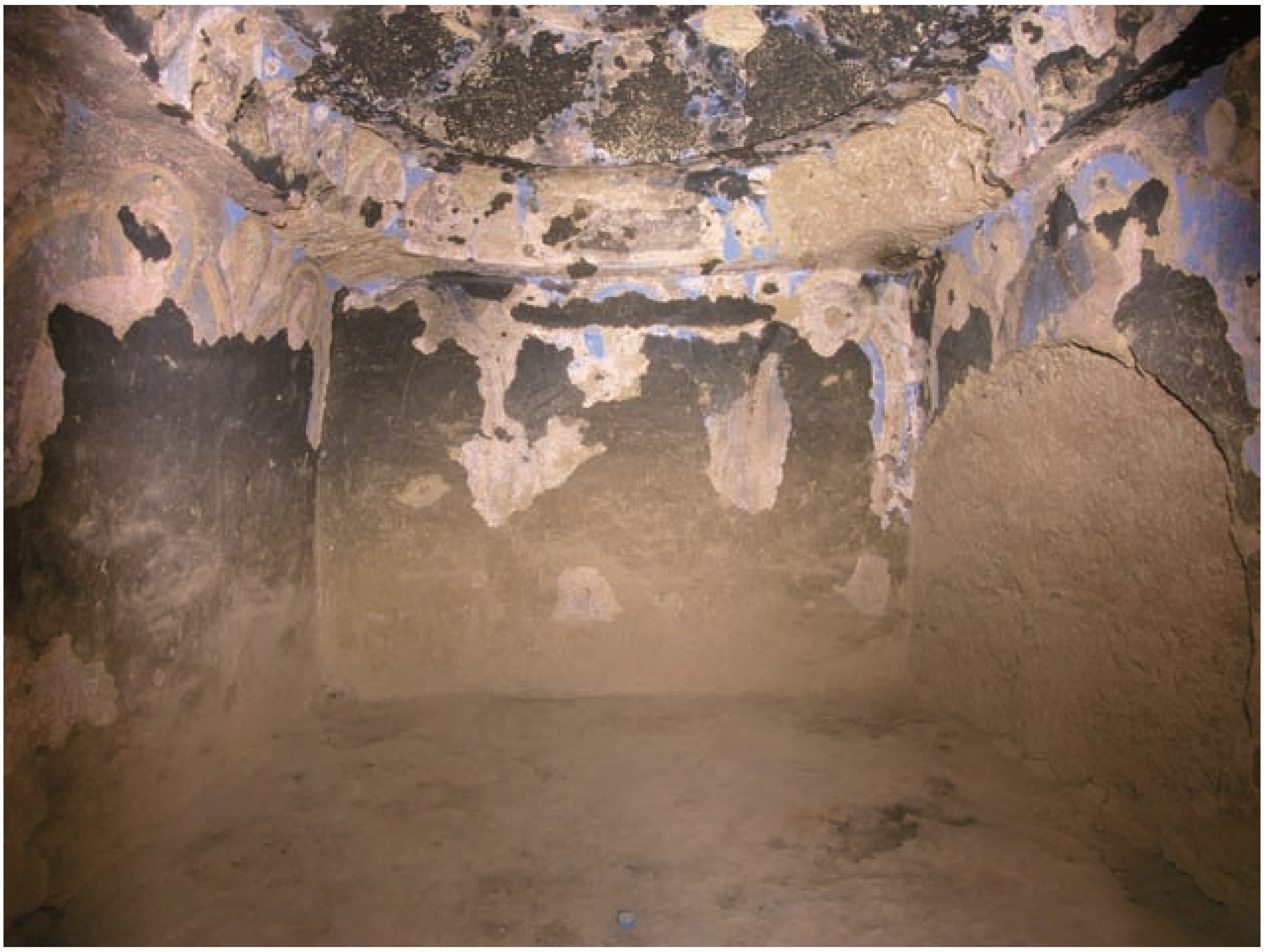


Figure 639 Tambour: Cave J(d).

the dome by attaching a squinch or forming an octagonal or hexadecagonal plan. It also has mural paintings and three-dimensional arcade decorations, which indicate that the tambour was a highly significant component of the cave's construction.

Caves with the vaulted ceiling and oblong plans often have a unique feature: a corbel divides the wall horizontally by a difference of level. This difference is found between the side walls and curved ceilings, as well as on the tambour in the oblong plan. Such corbels have been found in the Kizil Caves in China, in which well-preserved mural paintings still remain. Here, a cornice-like part was used. This horizontal division was designed to partition the wall surface.

Cornice

The cornice, a projection zoning the wall surface horizontally, is often found in caves with a centred plan in Bamiyan. The cornice was frequently utilised in the West in Greek architecture and masonry construction. It is therefore assumed that the method influenced by this style of masonry construction was also adopted in Bamiyan. The shallow cornice probably functions as simply a partition of the cave surface. It is presumed that the deep cornice attached to the serial arch and arcade, or to a series of mortises, acted as a pedestal for statues. In fact, the top face of the cornice in Cave C(a) has striae at regular intervals in which some object must have been installed (Fig. 640).[2] Cave U also has mortises at regular intervals in the re-entrant angle of the cornice's lower surface. This indicates that three-dimensional statues must have been situated in this space, suggesting that three-dimensional designs would have been installed on the lower face beside the cut surface.

Some caves retain a triangular base at the re-entrant angles of the side walls created by the tambour and cornice forming a circular plan when the dome was used for the square plan (e.g. Caves J and T). This structure, centred on a stone corbel, has been found frequently in the superstructures of Buddhist temples in Gandhara and Cashmere (Fig. 641). Since it was difficult for brick construction to create a horizontal space on the transitional part, such a structure was probably derived from masonry construction by using stone plates.

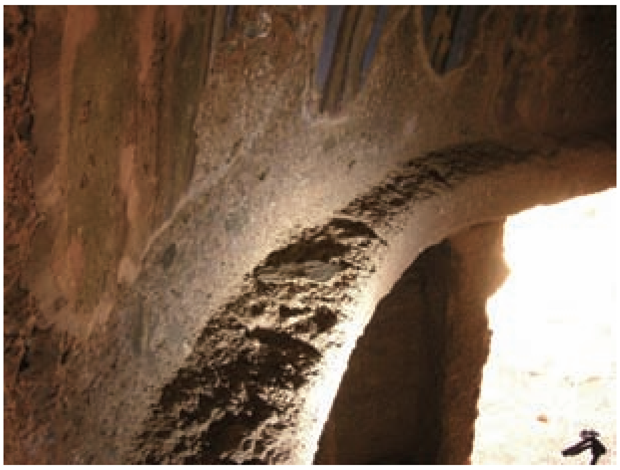


Figure 640 Cornice: Cave C(a).

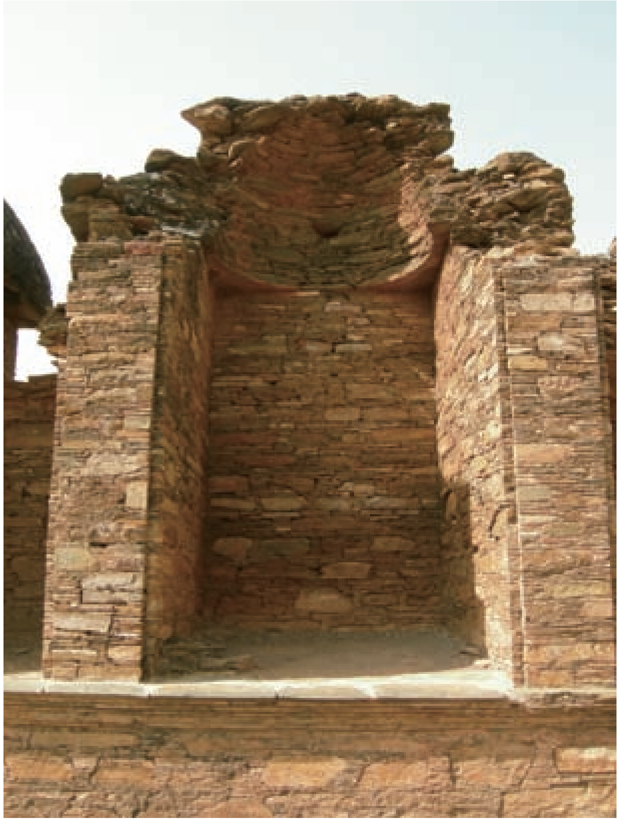


Figure 641 Takht-i Bahi: transitional section with a triangular base at re-entrant angles.

Squinch

The squinch is an arched part at the corner created by connecting the domed ceiling and the square plan. In Bamiyan, there are squinch arches in which four, five or six corbels are bridged. This technique originated from the masonry construction of Sassanian Persia, where the corners fundamentally supporting the upper structure and the side walls of the square plan could be connected to the domed ceiling. In Bamiyan there are many caves in which the squinch was built inside the tambour (Fig. 642); by contrast, only Caves G and F1(a) have squinches directly engraved on the dome (Figs 142, 643). In addition, Cave D1 has a squinch-like design engraved on the upper part between the niches (Fig. 372). This inspired decoration may have nothing to do with the actual function of the squinch. Cave D1 dates back to the middle of the sixth century, based on calibration measurements of the straw. The caves with squinches inside the tambours are widely believed to date from the middle of the fifth to the eighth century.

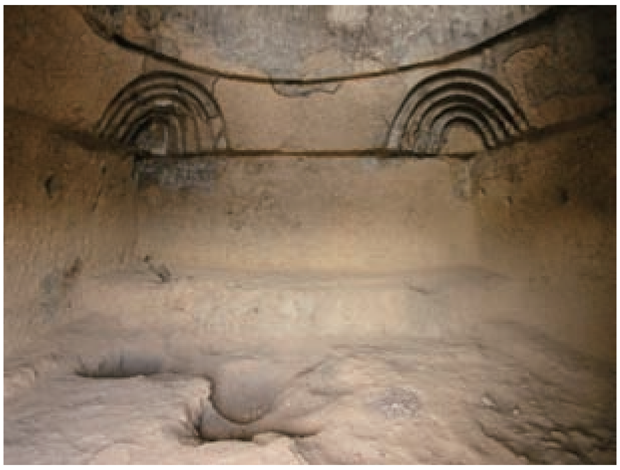


Figure 642 Squinch: Cave B(a).

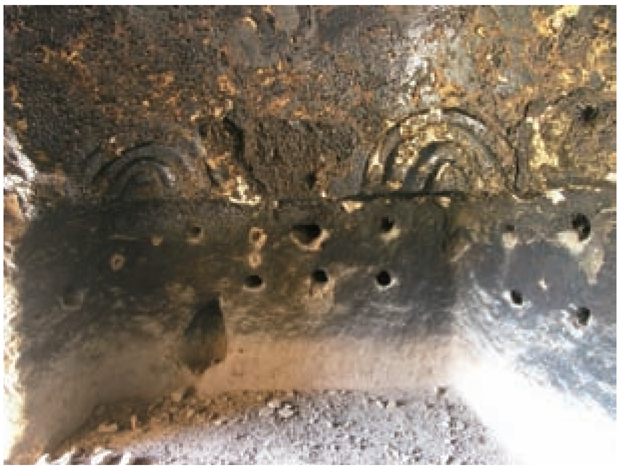


Figure 643 Squinch: Cave F1(a).

Form of the doorway

There are various types of entrances, adjacent pathways, windows and doorframes in these caves.

Traces of wooden doorframes are commonly found around the entrances attached to either both the inside and outside, or to one side of the entrance. The existence and shape of the doorframe indicates whether the opening spaces are results of later changes to the caves.

Table 5 [copy to follow]

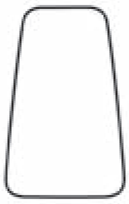
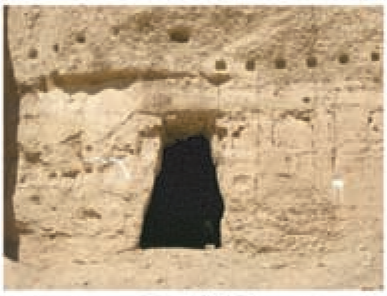
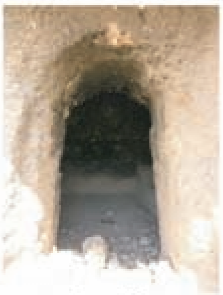
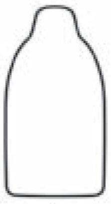
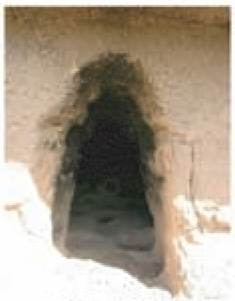
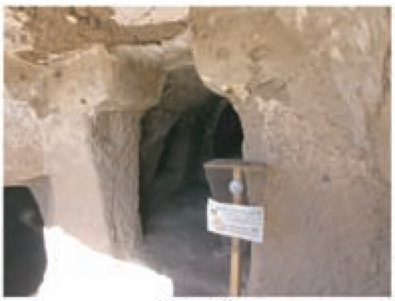
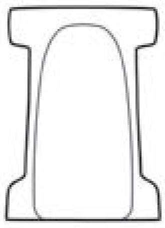
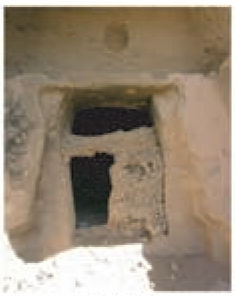
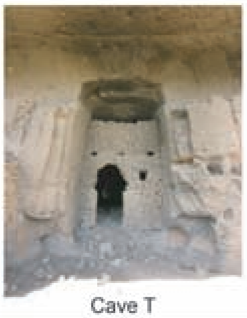
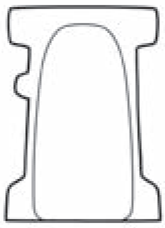
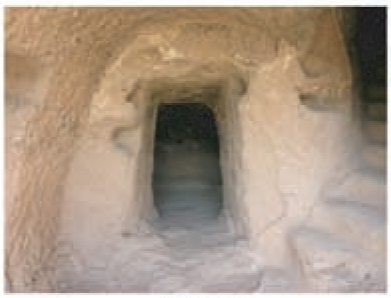
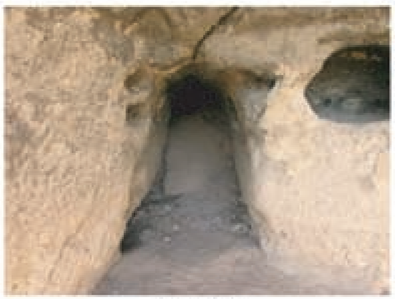
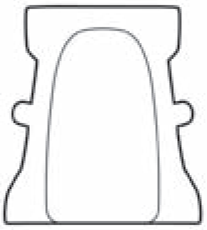
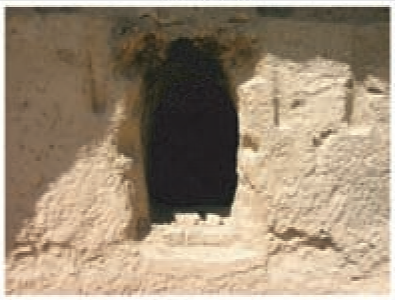
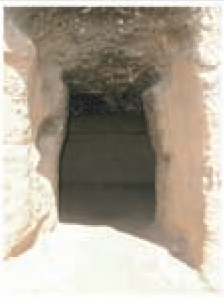
Types of doorways	Examples of caves	
 (i)	 Cave XIII(c)	 Cave 78
 (ii)	 Cave East I(a)	 Cave K3
 (iii)	 Cave L	 Cave T
 (iv)	 Cave J(g)	 Cave S(i)
 (v)	 Cave Z(a)	 Cave East V(a)

Table 5 lists the main entrance and doorframe forms as well as some of the variants. On the left side of the doorframe-like concave of the arched and trapezium entrance, there is another concave at a higher point (Table 5 (iv)). If this was a device for a door bolt, it was probably too high. Type (ii), which has a tall ceiling, is found frequently at the entrances to small caves. At this time however, it is difficult to understand the relationship between the cave's function and the entrance.

Caves D1 and T have large entrances (Figs 125, 373). If these entrances are original, it would be plausible to assume that there was a scheme designed to distinguish them from other caves with small entrances.

Axis

Since the caves in Bamiyan are situated on the southern surface of the cliff, it is often said that they align primarily along a north–south axis. Nevertheless, some caves face the stupa to the southeast of the East Giant Buddha, such as Caves T and U. The axis of Cave D1 is not straight; however, the entrance is parallel to the cliff surface. In the case of Caves D and C(b), the axes of the plan and the ceiling are not identical.

As for niches in the caves, they appear to have been placed on the east–west and north–south axes. Cave B1(c), with the entrance in the western side, features an east–west axis and the niches at the centre of the eastern, northern and southern walls are larger. Likewise, Cave C(a) has an entrance in its southern side and the niches on the eastern, northern and western walls are rather large. Furthermore, the niche on the east–west axis is attached to the pedestal. This differentiation probably demonstrates the programme for cave construction in relation to the various axes.

Many independent caves have symmetrical plans, however the niches of several caves, such as Cave K3, were built asymmetrically.

Later alterations

Some caves appear to have been modified after their original construction. Cave XIV(a) was actually transformed into a cave with a half-domed ceiling in the southern side and a flat ceiling over its northern side (Figs 557, 560). It is believed that the original cave with the domed ceiling must have been extended at a later date. This cave is approximately 16.5 m deep, which is quite large for the caves with the rectangular plan in Bamiyan. The side walls were carved with a zone of serial trefoil figures. This cave is too large to have just housed the activities of daily life, which leads us to think that it must have been expanded for religious purposes. It will require time and examination of the wall clay straw in order to determine whether this expansion occurred just after the cave with the domed ceiling was originally constructed. This alteration was presumably carried out because of a change in the cave's function or the need for a bigger space to hold a large group of people in the cave; understanding this chronology will help us to investigate changes in the existing forms in the Bamiyan Buddhist Caves.

Cave V(d) and Cave 49, in the Kakrak Valley, also show evidence of alterations and later expansions. Their front areas have the *laternen-decke* and the rear areas have been expanded into square rooms. In this case, the scale is not as large and the purpose of the alteration is uncertain.

Location

Distribution of the caves

The Bamiyan Buddhist Caves are situated at various heights on the cliff. This scattering distribution is also found in other Buddhist caves in Afghanistan (Verardi and Paparatti 2004). In Bamiyan, some caves, such as Caves F, J and R, are aligned horizontally at the same height, placed at vertical intervals, and connected by a stepped passage. A half-demolished stepped passage to the east of Cave East V(c) remains upright, which indicates that (at least) one more cave was placed above it. It is neither in an area dense with caves nor are there significant numbers of layers.[3] The reason why people used this method is uncertain.

Some horizontally aligned caves, such as the Mogao Caves in China, are attached by a passage constructed with cantilever beams on the highest point of the cliff.[4] When a pathway is used to connect caves, it makes sense to create the caves at the same level. In the case of Caves F, J and R, mentioned above, since they are situated at the highest point on the cliff, a pathway connecting the cave interiors would have been more suitable than a passage constructed with cantilever beams, for security reasons.

At the highest level, the size and form of the caves with different heights vary, and it is difficult to discern the common function they all shared. Cave I, the cave-niche for a seated statue, is located by itself at the highest level. Cave J(b), with a domed ceiling and the remains of a stupa, is situated 1 m higher than the cave-niche for a seated statue. As for Caves F, the smaller Cave F(c) with the *laternen-decke* and square plan is higher than Cave

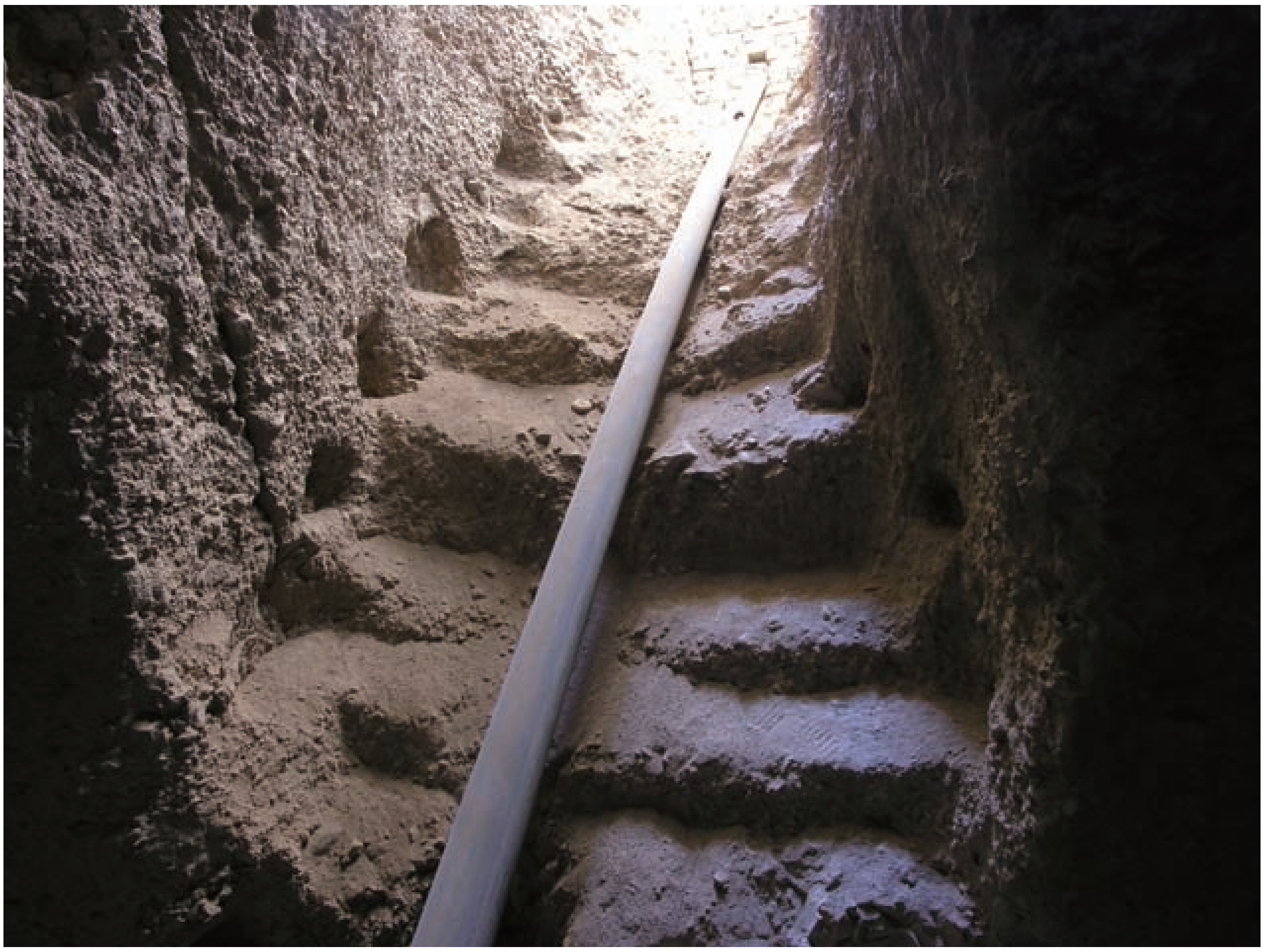


Figure 644 Stairway from the east of Cave 134 to the front of Cave B(a).

F(a), with the octagonal plan and rich decorations. In the case of Caves R, the caves share a forecourt and were constructed at the highest point. Nevertheless, each cave is spaced out at different vertical intervals and it is not confirmed that the caves were aligned horizontally at the same level.

Access to the caves

To date it remains unclear how the Bamiyan caves were accessed. How did one reach the caves at the highest level, such as Caves East I, Caves II and III, Caves K Upper and Caves XIII? The wooden remains on the cliff surface are components of the caves' upper spaces. Horizontal or stepped passages that connected the highest caves have not been verified so far. Based on the traces of stairways found around the highest caves, we can assume that, at this high level, stairways were used for vertical transfer instead of interior passageways.

Some of the pathways and stairways were obviously created at a later date, based on their form and layout. For instance, based on their shapes it can be inferred that two opening spaces between Cave E(b) and Cave E(c) were added at a later date. Also, Cave K(331), in the middle of Caves K, features a stairway in the interior of the room, which is not consistent with the caves' original construction (Fig. 426). The staircase from Cave F(b) to Cave F(c) features a ceiling whose eastern side is only 140 cm high, too low to have been included in the initial construction programme of this cave.

Well-preserved staircases indicate that the section was oval-shaped. Their turn-up point has no sharp angle and is finished in a rounded shape. The staircase from the east side of Cave 134 to the front of Cave B(a) has indented foot-worn steps in its centre (Fig. 644). The steps were presumably designed to fix the plates and avoid the abrasion of each step. Cave 141 and Caves V also display the same feature.

Since the stairways are significant for understanding the layout of the caves, we recorded them on the cave location map. It is necessary to distinguish later alterations to pathways and opening spaces from the original layout. We must closely investigate the details of the

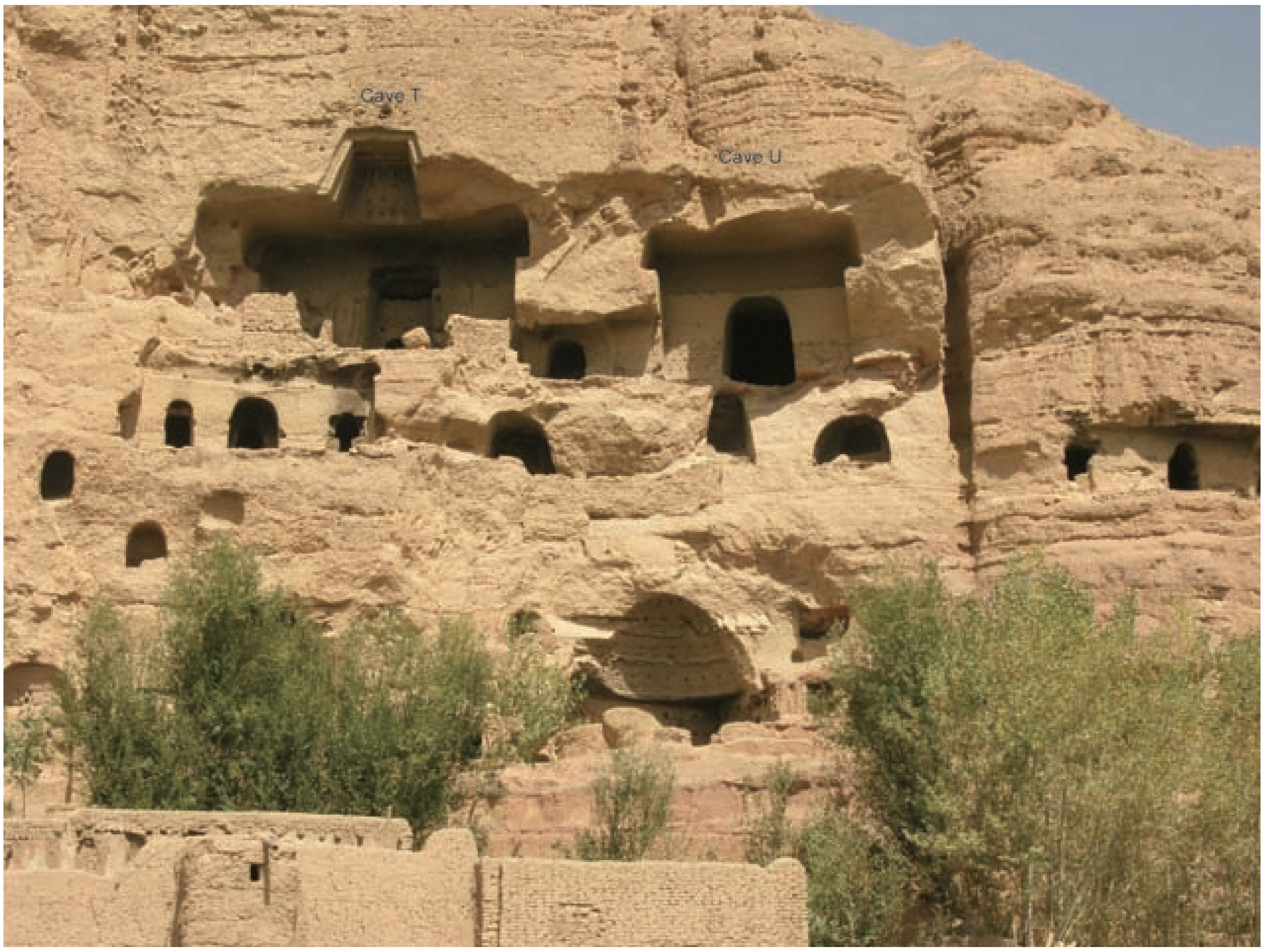


Figure 645 Cave T and Cave U.

caves in order to ascertain which features are original and which were additions, even as continuous change to the caves is inevitable.

Grouping of the caves

After examining later alterations and the stairways connecting the original caves, we discovered that some caves, which we had classified as one group[5] on a plan map, should not actually be categorised in the same group. For example, Caves E consist of caves united from east to west by opening areas perhaps constructed in later times, making them appear as if they are one unit of connected caves. However, the style and location of the opening areas, and the height of the floors, indicate that the opening areas between Cave E(b) and Cave E(c), Cave E(e) and Cave E(f), and Cave E(h) and Cave E(i), are clearly alterations made in a later period. On the other hand, there are partial remains of staircases found between Cave E(a) and Cave E(b), and in front of Cave E(h). These remains suggest that it is reasonable to instead categorise these caves as several groups connected vertically (Fig. 647). It is also conceivable that Caves P, Q and R, to the east of and above Caves E, were originally one group linked in a vertical direction.

There was a stairway running from the point between Cave B(d), currently closed, and Cave B(f) in its lower eastern area, as well as a staircase between Cave T and Cave U (Fig. 645), which implies that these caves were connected to lower caves and stairways. It is important to define the groups of caves that share staircases and pathways in order to understand the function and meaning of caves linked by their location. This mission has found many forecourts shared by caves that had not been confirmed until now. The forecourt is also a crucial element for understanding the locations of caves, along with the pathways and staircases.

Consequently, we are convinced that past research on the caves' locations based on the plan map is not enough, and that it is essential to examine the relationship of caves connected vertically from a three-dimensional viewpoint. This might give us new results and a new understanding of the caves' locations, as the example of

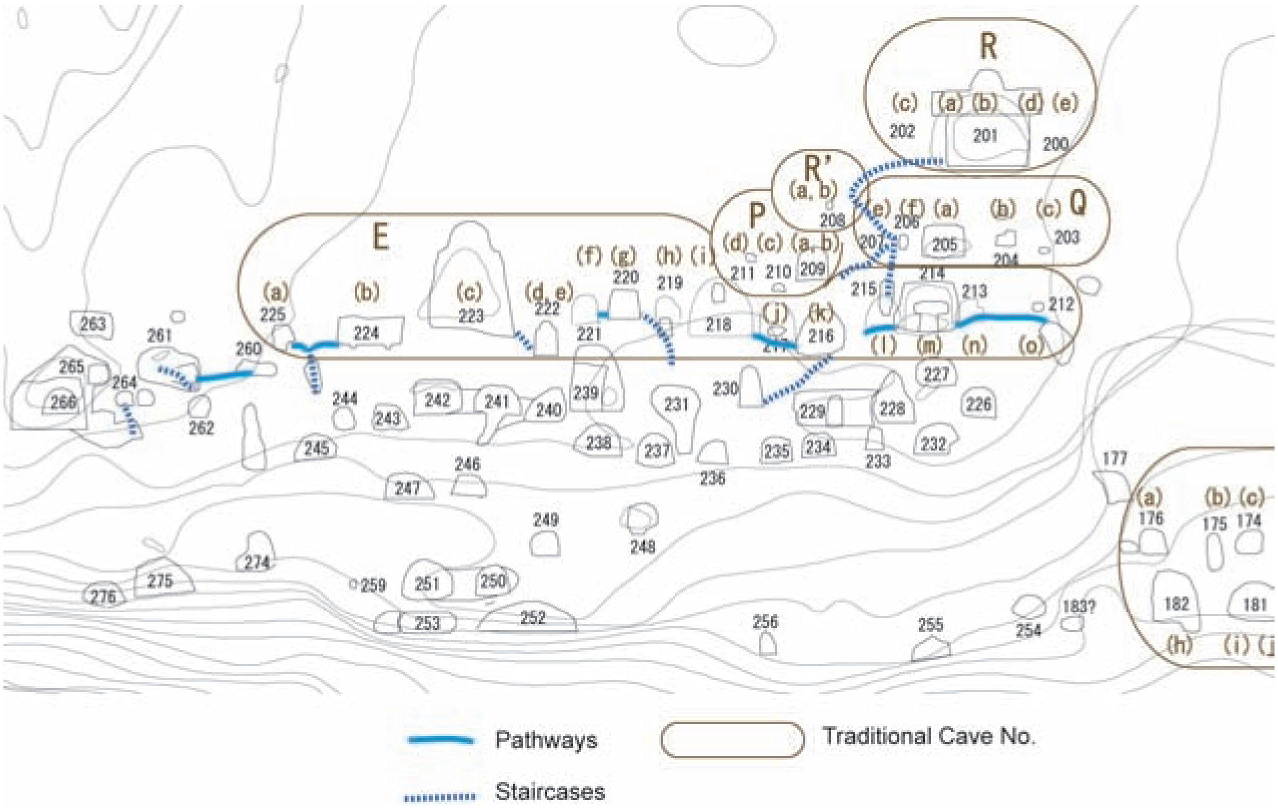


Figure 646 Grouping by traditional cave numbers: around Caves E.

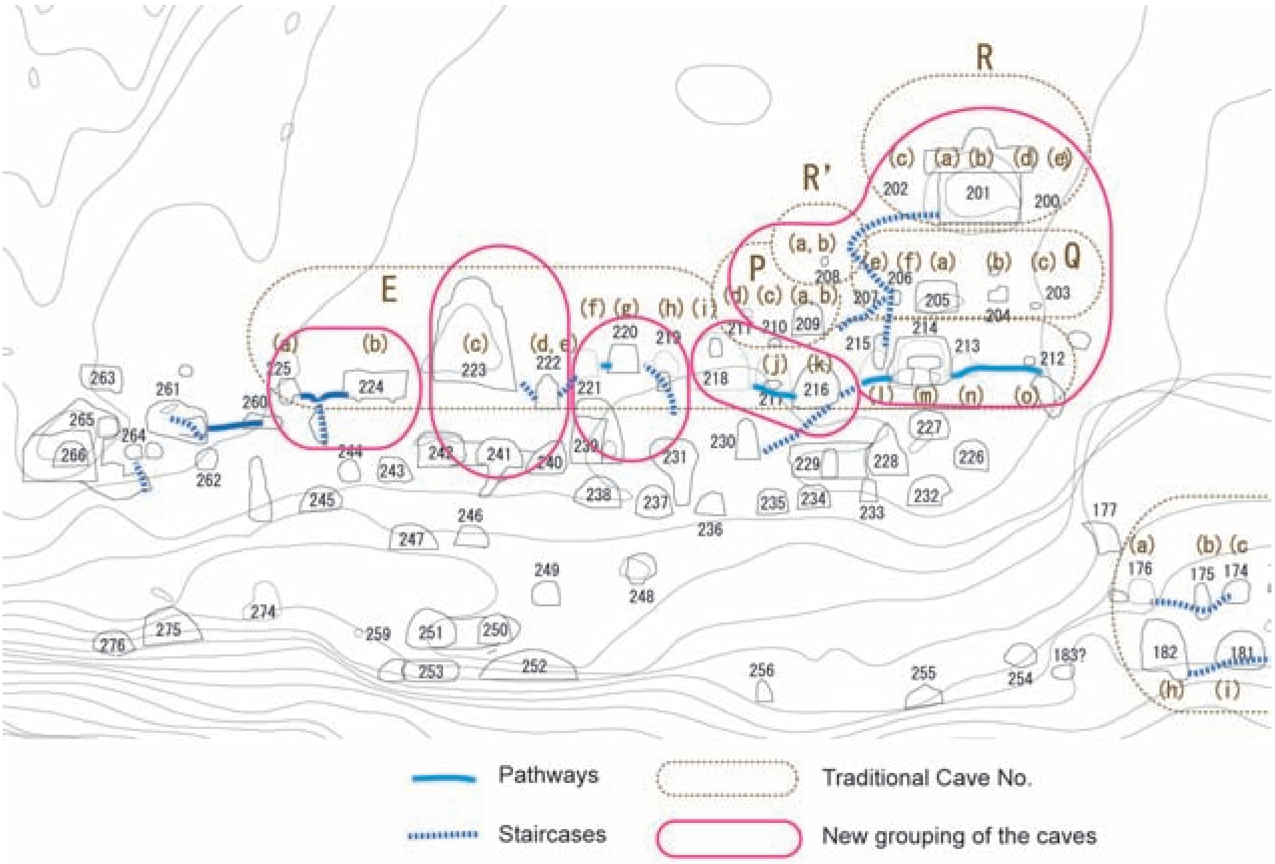
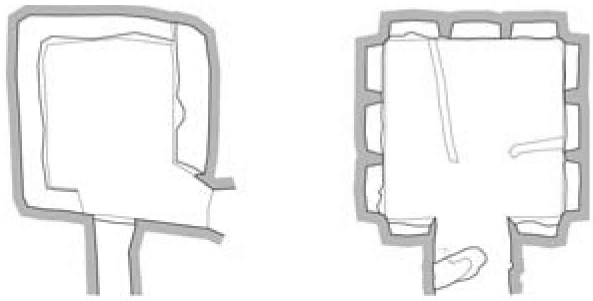


Figure 647 New grouping by stairs and original pathways.



The plan with bench-formed pedestal along the side wall (Cave J(b))

The plan with niches in the side wall (Cave U)

Figure 648 Layout of the Buddhist statues inside caves.

Caves E indicates. We therefore suggest that the names of the caves should be revised as well to avoid misunderstanding the correlativity of caves caused by inaccurate naming.

Forms and designs inside the caves

Forms inside the caves

It is difficult to understand which types of religious forms were employed inside the caves in Bamiyan because of the major collapse of the cliff surface, the destruction of the caves themselves, and the current lack of philological information. It is apparent that bench-like pedestals were installed along the three walls, but not the side with the entrance or in niches on the side walls (Fig. 648).

Bench-like pedestals were found in caves with both circular and square plans, such as Caves A Lower(a), B(a) and C(b). Caves J(b) and G contain traces of a stupa at their centre. The heights of the pedestals vary from a few centimetres to 50 cm. They range in depth from less than 30 cm on the right wall of Cave M to more than 150 cm in Cave E(i). It would be plausible to assume that standing or seated statues were placed independently on the shallow pedestals in many cases, as indicated by the regularly spaced mortises on the side walls. In contrast, no mortises were discovered on the side wall in Cave E(i), which indicates that this pedestal would have been used for a separate seated statue. It is also possible they were used as seats for the monks.

In some cases, such as in Caves U and T, the Buddhist statues would have been situated in the niches on the side walls. In Caves A Upper(c) and C(a), there were cuboid pedestals, possibly for the Buddhist statues, carved out in the niches. We need the results of carbon dating of the straw from the wall clay in order to understand whether the Buddhist statues were placed on the bench-style pedestals or in the niches; the answer will determine the cave's chronology. The decorative Buddhist statues inside the caves extended not only to the side walls but also to the tambours and ceilings. It is believed that the statues would have been placed on a deep cornice such as the one in Cave C(a). Even though it is presumed that there would have been stupas at the centre of caves with the centred plan, unfortunately, except for Caves J(b) and G, sand, grit and dust have made it impossible to sufficiently examine the floor conditions to fully resolve this question.

Great attention has been paid to the centralised layout of the Buddhist statues facing inwards from along the side walls of the caves. It is very important to determine what was at the centre and whether this was a site for prayers. In addition, many caves with the centred plan are ornamented – not with three-dimensional decorations but with mural paintings. Numerous caves, such as Caves East IV(a), E(e) and Z1, still retain traces of mural paintings. In some cases, the concentrically painted Thousand Buddhas has been found on the domed ceiling. Carbon dating of the straw demonstrates that these caves were constructed separately from approximately the late fifth century (Cave J(d)) to the ninth century (Cave Z1), which means that the two different types of caves (one decorated with Buddha statues and the other with paintings) would have existed simultaneously. Cave K3, with the oblong plan, also had an excellent painting of the Thousand Buddhas, indicating that it was not only caves with the centred plan that were decorated with mural paintings.

Architectural designs inside the caves

There are many architectural structures and components inspired by the cornice, arch, pilaster and squinch inside these caves. Niches on the walls mainly take an arched shape, and niches on the tambours are most prominently in the shape of the trefoil and trapezoid arches. The niche shape is shared by almost all the caves on the Bamiyan Great Cliff; however, there is diversity in their designs. Some niches, such as those of Cave T, are connected by cylindrical and rectangular pilasters between the niches, producing an arcade-style niche. In addition, the niche in Cave 35-III, an independent niche, is attached with pilasters on both sides (Fig. 649). In these cases, the arcades have short pilasters and rather large arches, such as those found in Cave F(a) and Cave T (Fig. 650).

The pilasters on the side walls of Cave A Upper(c) (Fig. 217), Cave B1(c) (Fig. 282) and Cave D1 (Fig. 371), conversely, are tall and have a capital and foundation that appear to have been used as actual architectural parts. In fact, the tambour of Cave A Upper(c) has an arcade with a shorter pilaster, indicating that different types of

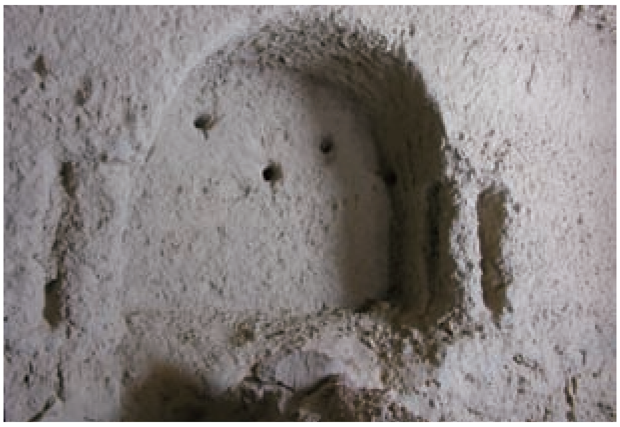


Figure 649 Cave 35-III: side wall and pilasters.

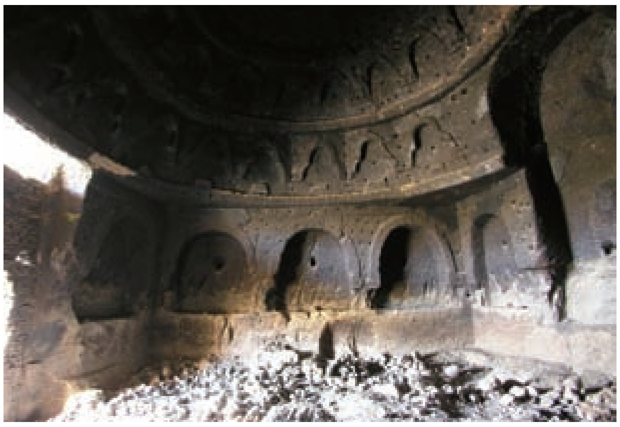


Figure 650 Cave T: niches on the side wall.

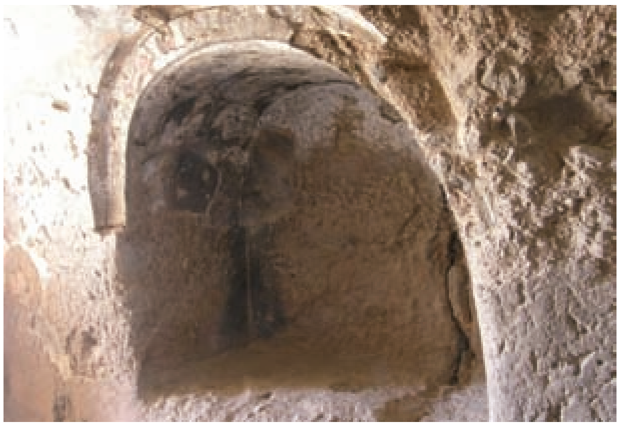


Figure 651 Cave K: hemmed niche on the western side.

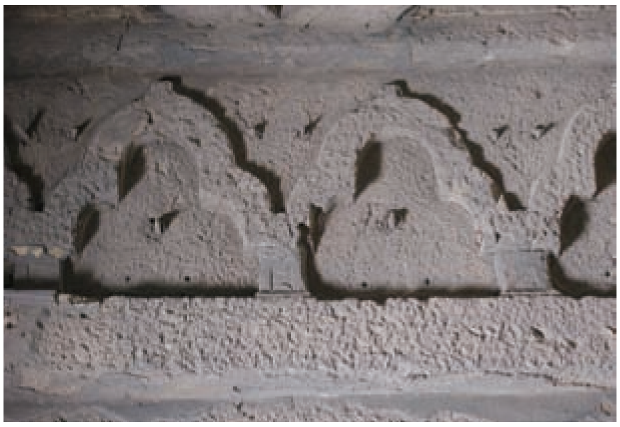


Figure 652 Cave 53-V: trefoil arcade.

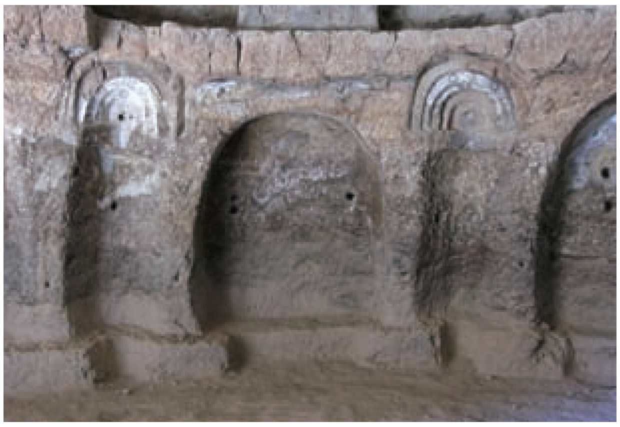


Figure 653 Cave D1: squinch.

pilasters were utilised in the same cave. It is therefore inconceivable to state that the diversity of pilasters is strictly connected to the chronology of the caves, although this difference should be noted. The chronology based on the niche's shape will be discussed again later in this chapter. These pilasters generally indicate columns with capitals, which were used for masonry construction. It is noteworthy that *dougong* (components on top of the columns supporting the rafters and overhanging eaves of a roof), which are typically found in caves in countries that use wooden construction such as India and China, have never been verified in Bamiyan.

There are many hemmed niches and trefoil-shaped arches, and there are several types of tops, including the arch, tower and convex (Figs 651, 652). Contrary to some previous studies claiming that hemmed arches are not common in Bamiyan (Verardi and Paparatti 2004: 19), elaborate examination allowed us to discover many instances of hemmed arches. Geometrically patterned decorations, such as those found in Sangdara Cave 2 near Kabul, have never been documented in Bamiyan. Three-dimensional arabesque designs made by rammed earth and mural paintings of the Thousand Buddhas, however, are popular. The entire domed ceiling of Cave XI has a three-dimensional mesh design between serial arches at the spring, and a hexagonal pattern in three dimensions in the central area (Fig. 498).

The niches and arcades are mostly designed to fit in the side walls, partitioned by the cornice and corbels or the tambour, except in the case of a very large niche such as that found in Cave T (Fig. 121), where the niche dominates both the wall and tambour at the centre of the front face. Another exception is Cave B1(c), in which the four corners of the tambour are high enough to reach the ceiling (Fig. 285). Mortises on the back wall of the niche imply the existence of a statue, which is unusual in Bamiyan. Small niches outside of the axis and layout plan could presumably have been shelves added in a later period.

In addition, a squinch and the inspiration for the squinch (side wall of Cave D1; Fig. 653), a partitioning of the wall surfaces by the cornice, and the inspired *laternen-decke* and dome on the ceiling have all been found in these caves. The *laternen-deckes* tend to be arranged in a plane, including the corbels.

In conclusion, it is indisputable that the architectural designs found in the Bamiyan Buddhist Caves reflect the architecture of other structures: the *laternen-decke* represents a wooden structure, and the dome, niche, squinch and cornice also mirror those found in masonry construction. This study is thus invaluable not only for research on the superstructures of this period, but also for investigating cultural exchange between the East and the West.

Techniques for cave construction

Quarrying and processing technique

For quarrying and processing, several types of tools were generally used, depending on the rock quality for each stage, including rough chipping, chiselled work, bush-hammer work, dabbing and polish finish. Processing work was also divided, mainly into four tasks: breaking, grinding, carving and polishing, the last of which has not been confirmed in Bamiyan. Polishing might have been omitted in Bamiyan.

Evidence from some of the caves indicates that the processing work evolved over time. For example, the following text explains how evidence from Cave C(d) can narrate the evolving technique of quarrying and processing in Bamiyan. First, the bedrock was burrowed for a square plan, with the curved corners on a gradually rising plane surface. Second, the rock was drilled up to the planned height at the provisional centre of the cave. Work on Cave C(d) appears to have stopped at this stage. The current wall surface shows the wholly chiselled work, but no rough chipping is visible. It is believed that the cave would have been expanded successively from the centre to the periphery, before the final stage of the finishing process. Cave construction consists of two processes: first the interior must be outlined, and then the details must be arranged.

All the caves (in Bamiyan) appear to have been constructed with only rough chipping and chiselled work; bush-hammer work and dabbing have not been verified in this project. On the contrary, some Buddhist caves from the Foladi Valley contain exposed surfaces finished with dabbing. Bamiyan bedrock consists of siltstone and gravel layers, which are very soft. In particular, the gravel layer holds various pudding stones, which are not suitable for bush-hammer work and dabbing.

Finishing work

The surfaces of the caves were normally daubed with wall clay on which there were arranged mural paintings or three-dimensional decorations made of rammed earth, along with statues and reliefs. Many caves were finished with wall clay, which means that the bedrock of the Bamiyan Great Cliff is perhaps too soft to sculpt directly for finishing. Some surfaces were plastered with a middle layer and then a layer of topcoat over the wall clay, and others were finished with a basecoat of the mural paintings. Cave XV(b), which was made from rough bedrock, has the thickest layer of wall clay, and the finished surface is ornamented with elaborate works made of plaster applied by trowel. Cave M helps us understand that the rough wall clay was smoothed by hand, which would have been the plastering technique at that time (Fig. 182). It shows that plasterers have painted balled wall clay on the surface by hand.

Cave XI features a well-preserved finished layer above the tambour, from which we can understand the technique of surface finishing. This cave reveals how the wall surface was finished by rammed earth and decorations were arranged in the following manner. After quarrying and processing, tenons were fixed in mortises at designated points, and the whole surface was coated with wall clay. Falling traces of decorations indicate that finishing work for the clay wall would have been conducted just before arranging three-dimensional decorations on the surface. This process is clearly better for attaching the decorations.

The niches in the tambours and the three-dimensional decorations on the second cornice are fashioned from rammed earth made by rough wall clay; they are built with a base of straw and then coated with finishing clay applied by trowel (Fig. 655). The arcade at the base of the dome is finished in basically the same way, although with some differences. The volutes and hemmed oblong decorations on the face of the niches would have been fashioned separately and then attached to the finished surface. This technique

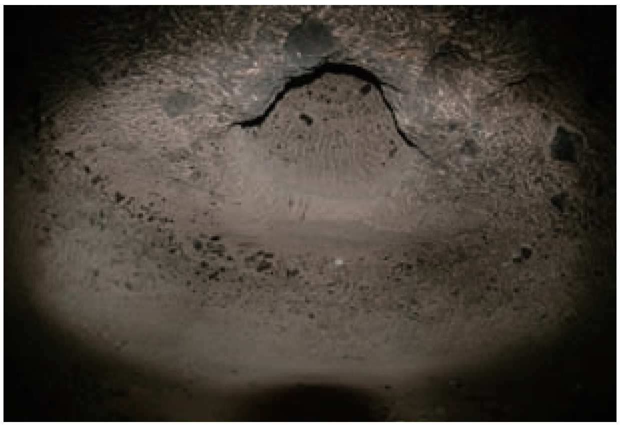


Figure 654 Cave XV(b).

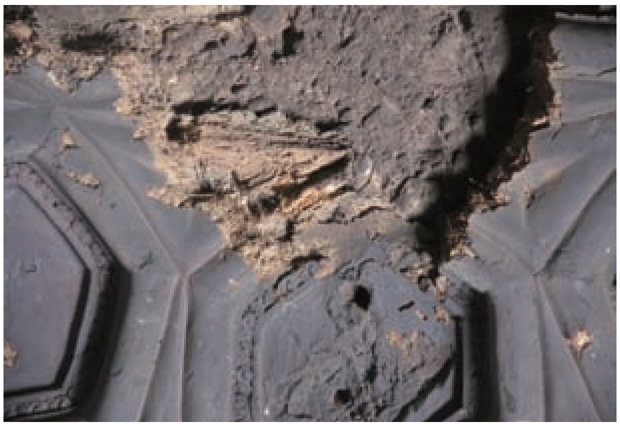


Figure 657 Cave XI: ceiling with hexagonal pattern decoration.

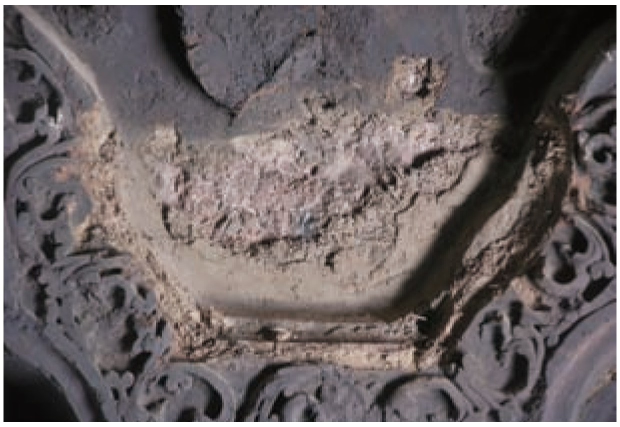


Figure 655 Cave XI: tambour with three-dimensional decoration.

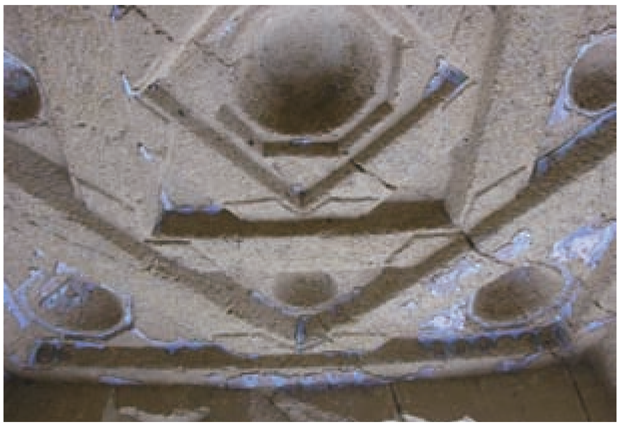


Figure 658 Foladi Cave 4: ceiling.

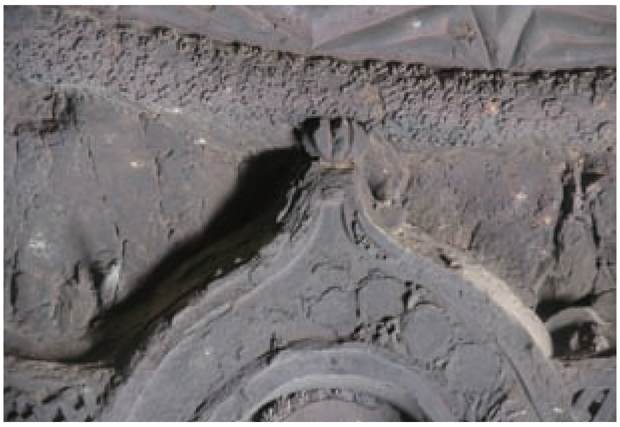


Figure 656 Cave XI: lower part of domed ceiling with three-dimensional decoration.

and process are understood based on observation of the traces of falling decorations. The decorated portion of the borderline above the arcade, marked by a floral pattern and separately shaped, also displays this technique and process (Fig. 656).

The technique applied to the hexagonal pattern on the top of the dome is intriguing (Fig. 657). The base is built up by rammed earth with a large amount of straw. The deteriorating condition indicates that this built-up base would have been blended with plant branches and stems, or rope-shaped objects.

Evidence from Cave A Upper(c), Cave D and Cave F(a) also indicates that the plastering technique at this time was genuinely skilled. This skill helped to create the Bamiyan Buddhist Caves and low-quality bedrock would have enhanced this technique. It is possible to discern the hypothetical layout of the three-dimensional reliefs and statues on the finished surfaces of the caves, on the basis of the size of the mortises remaining on the wall surfaces. The remaining pieces indicate that larger mortises on the walls were used for fixing standing statues, smaller ones in the niches or between arches were used to install seated statues and reliefs, and the mortises on the cornices and around the arches were probably for the pilasters made of rammed earth, along with the hemmed decorations.

For reference, the bedrock in the Foladi Valley, which is harder than that of Bamiyan, demonstrates more detailed chisel work and the wall clay is thinner (Fig. 658).

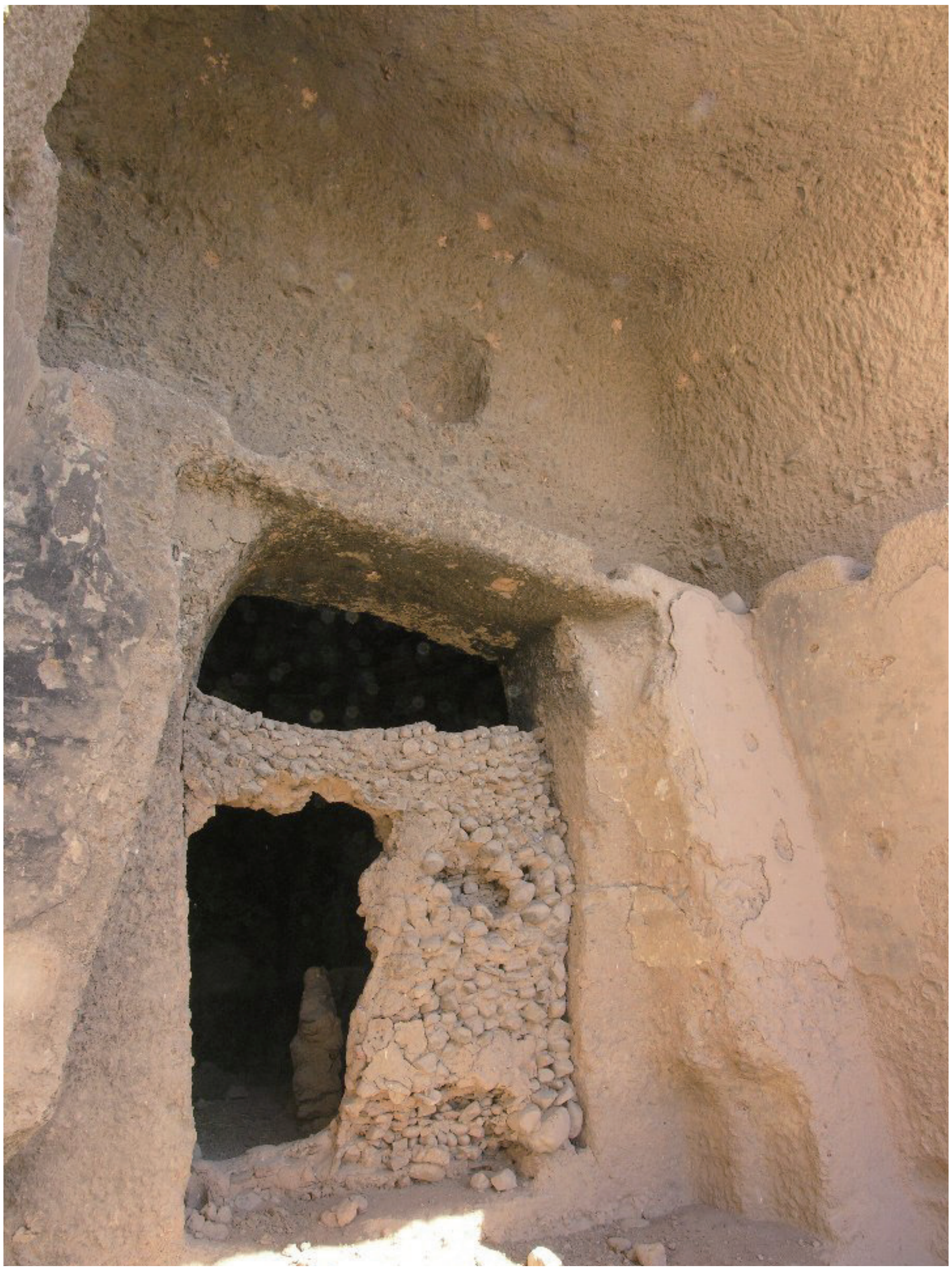


Figure 659 Cave L: northern face of the forecourt.

Traces of wooden structures

This section examines traces of wooden structures remaining inside and outside the caves. They are important elements relating to the façade fronts of the caves.

Forms of forecourts and traces of wooden structures

Some caves sharing a forecourt are located in the eastern side of the cliff. This section describes the various forms the forecourts take. Several caves are arranged with ledges on the upper wall of the cave entrance (including Caves A Upper, Caves A Lower, Cave C(b), Cave T, Cave U, Caves Z, Cave L), but there are others that do not have such ledges (these include Caves East I, Caves East V, Caves F, Caves F3).

The forecourts with hollows on the upper part of their wall surface have different depths and shapes. For example, the back wall of the ledge in Cave A Lower(a) is rectangular; however, the back wall of Cave A Upper(a) is curved. Cave B(a) still retains a possible trace of mural painting or finishing clay. In addition, caves such as Cave T, Cave U, Caves A Upper, and Cave L have mortises on the ledges into which beams of square timber would have been placed, along with channels for balks.

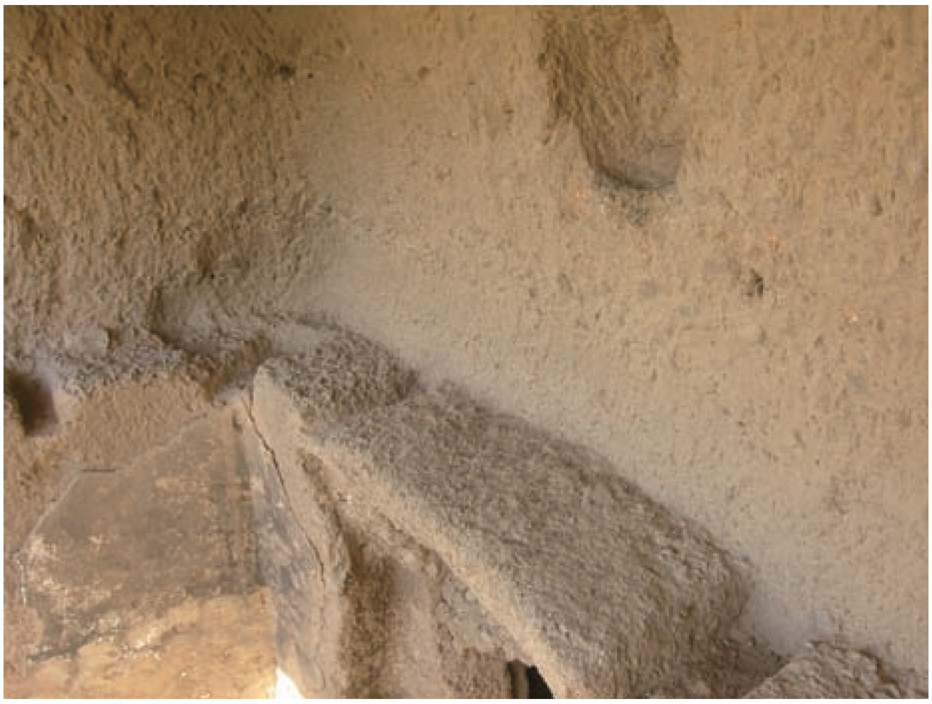


Figure 660 Cave L: concave on the upper part of the northern face of the forecourt.

On the ledge on the upper surface of the forecourt of Cave L, there are two engraved channels measuring ca. 20 cm wide and 40–50 cm deep (Figs 659, 660). These channels run in three directions – east, north and west – and each makes a right angle against each wall at two points. In addition, there are other channels in the northeast and northwest corners at 45-degree angles that appear to be devices for joists; however, no receptors for timbers have been confirmed on the back wall. It would therefore be necessary to install at least two columns in front (Fig. 190). All these channels are at the same height and face in the three directions already mentioned, which is the same configuration found in Cave T and Caves A Upper. In the cases of Cave U and Cave Z, the profile is blurry and the width and depth are uncertain because of probable aging and degradation.

On the upper part of the forecourt of Cave T there is an inspired trapezoid ledge. There are arch-shaped niches and skylight windows on the upper part of the forecourt of Caves B(a)–(c). We must examine the relationship between the forms of the upper part of the forecourt and the wooden structures in order to interpret the cave façade.

Traces of wooden structures on the cliff around the caves

The regular alignment of holes on the cliff around the caves is further evidence of the need to investigate wooden structures near the cave façade. They would presumably have been used to install some kind of structure on the surface of cliff. They are verified in Cave F(c), around Caves 134–137, east of Cave 377, between Cave H and Cave 403 (to the east of Cave H), west of Cave 436, and around Caves N and XIII (Fig. 661). Each cave retains traces of a wooden structure above the cave only. They were presumably used to hold structures such as eaves.

It should be pointed out that the existing holes have been exclusively verified around rather well-preserved caves on the upper part of the cliff. The lower part of the cliff has lost its surface because of erosion and weathering, which makes it impossible to discern traces of holes. In addition, traces of holes for wooden structures have never been found in the area between Cave I and the West Giant Buddha.

Traces of wooden structures in cave-niches for seated Buddha statues

Holes and channels in front of the cave-niches for the seated Buddha statues (Cave E(c), Cave H(a), Cave I and Cave XII) also provide crucial traces of wooden structures. The seated Buddha statues have already been broken, however; for example, Cave E(c) retains six channels measuring ca. 30 cm in front of the seated statue (Figs 662, 663). They are entrenched downwards into the cliff. In front of the pedestal for the seated statue there are holes corresponding to these channels. These holes were designed to be receptors for timbers. It is impossible now to measure the actual length of the channels because of the collapse of the cliff surface. They are currently approximately 1.5–1.9 m deep.

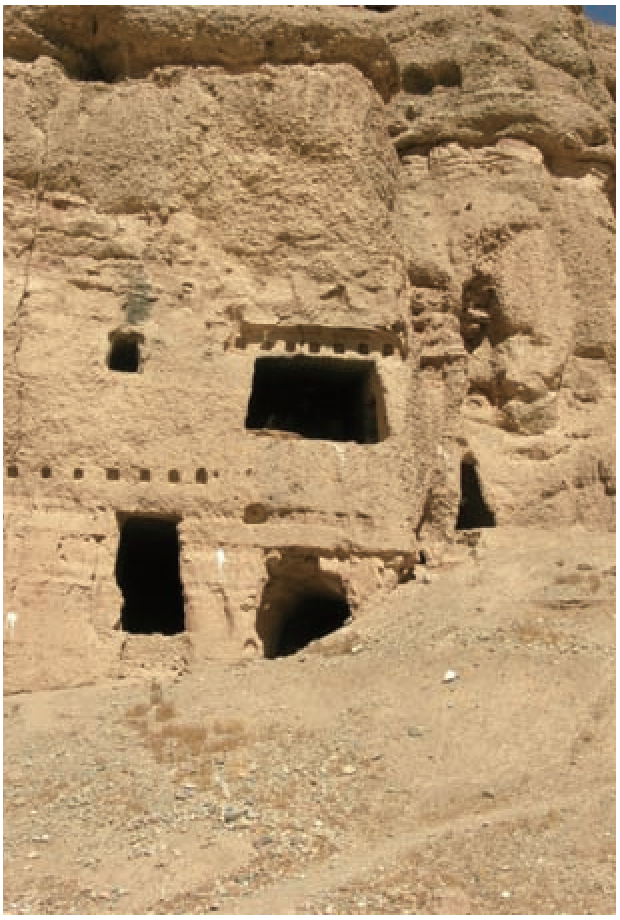


Figure 661 Caves III: façade.

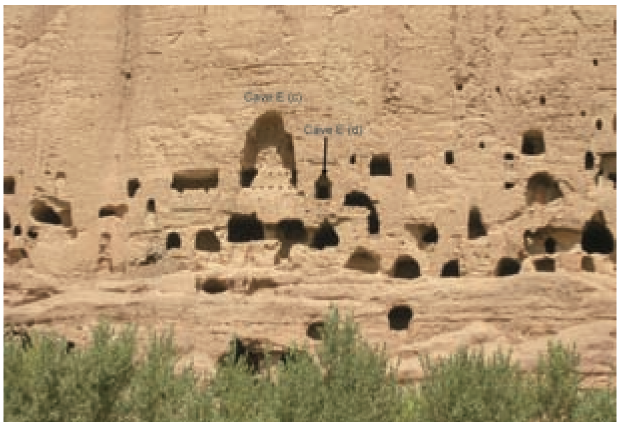


Figure 662 Cave E(c) and Cave E(d): façade.

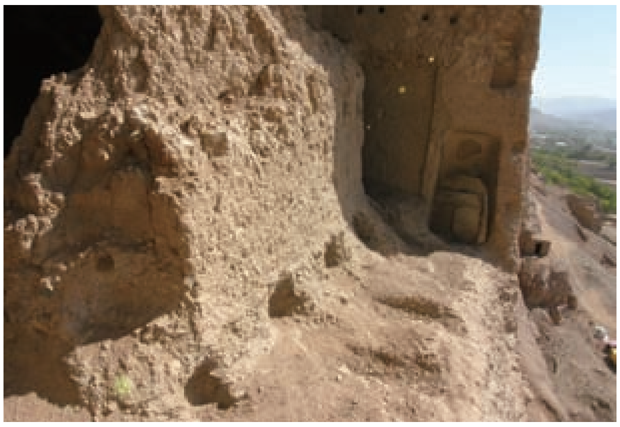


Figure 663 Cave E(c): traces of wooden structures in front of seated Buddha statue.

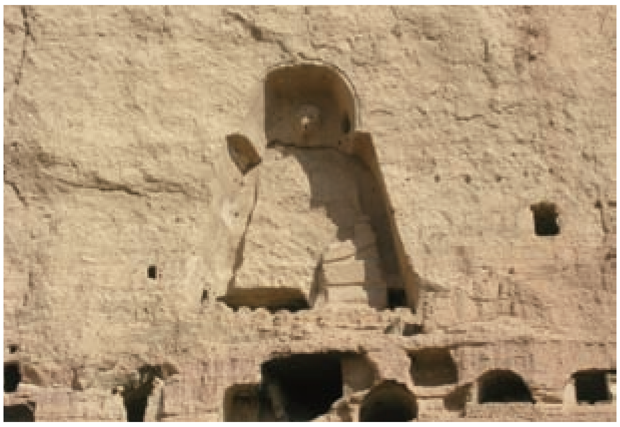


Figure 664 Caves H: façade.

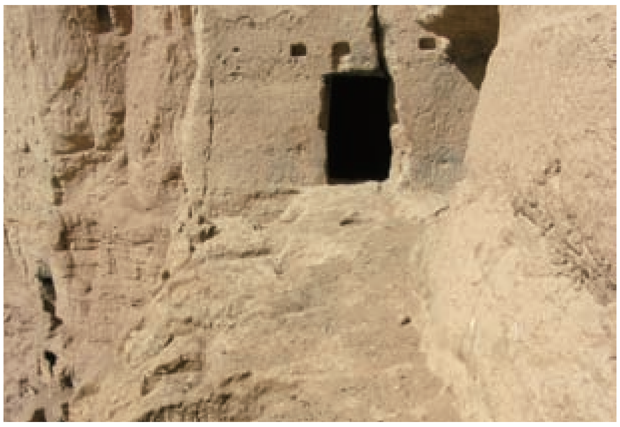


Figure 665 Cave H(a): traces of wooden structures in front of seated Buddha statue.

There are 10 channels in front of the pedestal for the seated Buddha statue in Cave H(a) (Fig. 664). As the cave-niche has been demolished, they are shallow and it is uncertain whether there are corresponding holes on the front face of the pedestal. Cave I retains only edges of the channels and four holes in the front face of the pedestal; these features conceivably correspond to each other.

It was impossible to reach Cave XII, nevertheless, there are certainly similar channels on the cave's floor based on its outer appearance (Fig. 666). They are probably remnants of a terrace-like structure that hung in front of the seated Buddha statue.

These cave-niches for seated Buddha statues have many holes that could have held wooden structures on the side walls and around the entrances. Cave J(a) retains

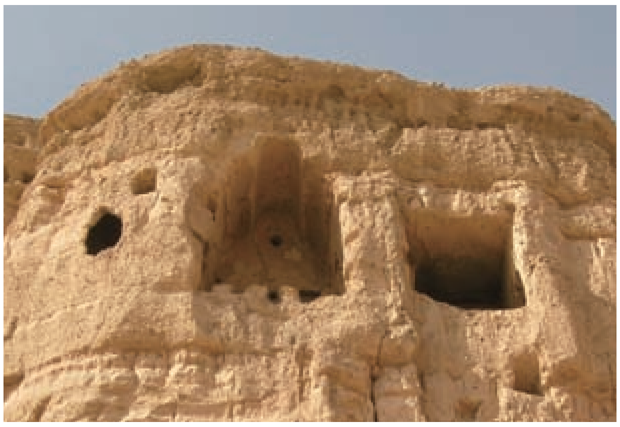


Figure 666 Caves XII: traces of wooden structures in front of seated Buddha statue.

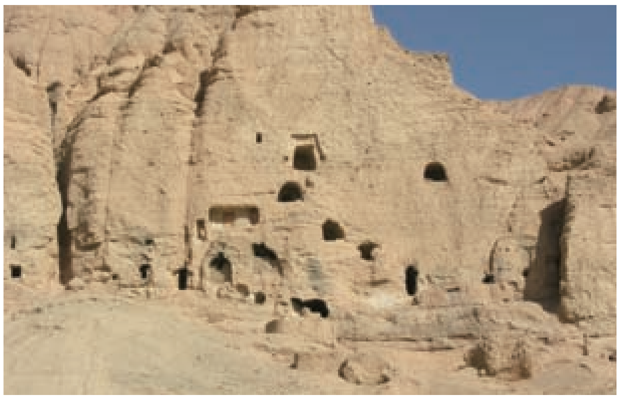


Figure 667 Cave J(a): façade.

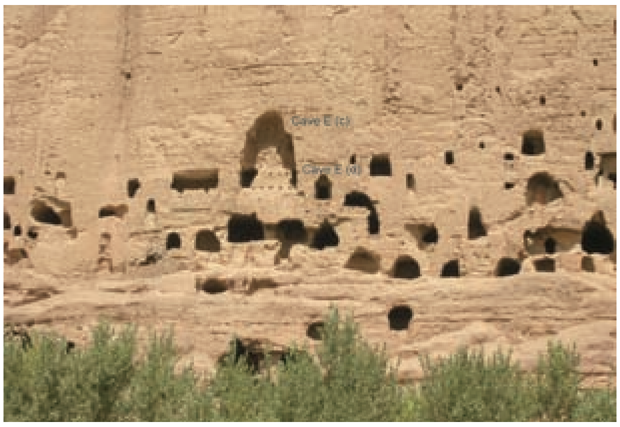


Figure 668 Cave E(d): façade.

square concaves on both sides of the opening area (Fig. 667), which indicate traces of a wooden structure in front. Cave E(d) has a horizontal engraving above the cave in addition to another carving hemming the cave vertically on both sides (Fig. 668). Further research will be necessary to understand the original appearances of the wooden structures in Bamiyan.

Summary

In Bamiyan, although traces of wooden structures and *laternen-deckes* reflecting actual wooden structures are confirmed, there is only a relatively small number of examples of wooden structures compared with the Buddhist caves in India, Tibet and China. Based on the timber length, there is no evidence of a module using the spaces between the beams, which is a standard technique for forming spaces in wooden structures. Consequently, it can be inferred that the Bamiyan Buddhist Caves generally imitated masonry construction and timbers were used for supplementary materials such as ceilings, terraces and eaves. This technique has been adopted for traditional buildings in modern times. In Bamiyan there are no traces of holes for a passage constructed with cantilever beams, such as those found in sites like the Mogao Caves in China.

We conducted partial measurements of the traces of processed parts possibly embedded with wooden beams around the caves. A square beam hole measuring 20 cm wide shows that thick timbers could be supplied to Bamiyan. In addition to these measurements, it is necessary to analyse images of the cliff surface to find beam intervals and material sizes.

Chronology of the Bamiyan Buddhist Caves

Some research has been done on the chronology of the Buddhist caves in Bamiyan from various viewpoints including art history and architectural style. In addition, scientific methods have recently been employed for dating. In 2005 and 2006, the National Research Institute for Cultural Properties, Tokyo (NRICPT) and the Nara National Research Institute for Cultural Properties (NNRICP) collected tempers and tenons for carbon-14 dating. These samples are under analysis with the Center for Chronological Research at Nagoya University. This section discusses the dating of the caves from an architectural viewpoint, based on the chronology of the wall clay of the mural paintings investigated up until this point.

Timescale and cave forms based on previous dating

Miyaji (2006) examines the dating of mural paintings in the Buddhist caves in Bamiyan, from the viewpoint of art history, in his work titled *Radiocarbon Dating of the Bamiyan Mural Paintings*. He roughly dates the Bamiyan Buddhist mural paintings back to three periods, based on the results of carbon-14 dating: the three periods are

Table 6 Timescale of the mural paintings based on the radiocarbon dating (Miyaji 2006).

Period	Timescale	Caves from which samples were taken
I-1	Mid-5th century–Mid-6th century	M, J(b), J(d), J(e), J(g).
I-2	Mid-6th century–End 6th century	C(a), Forecourt of C(a), C(b)
I-3	Mid-6th century–Early 7th century	D1, A lower (a)
II-1	Early 7th century–Late 7th century	Forecourt of D, D, N(a), S(a)
II-2	Mid-7th century–Late 7th century	F(a), B(a), East III
III-1	Late 7th century–Late 8th century	B(d), E(e), K3, I
III-2	Late 8th century–Late 9th century	F(c), Z1

‘Middle of the 5th century–Early 7th century’, ‘Early 7th century–Late 7th century’, and ‘Late 7th century–Late 9th century’. Additionally, he divides each of these periods into a few smaller periods (Table 6). In the following section, the architectural characteristics of the caves in each period are summarised first (Table 6), then the possible dating is suggested based on the forms of caves.

Period I (Middle of the 5th century–Early 7th century)

Caves J date from the middle of the fifth to the middle of the sixth century, which is the oldest era, Period I-1. The forms of the four caves from Caves J to Cave M are relatively small and have simple designs from an architectural viewpoint. Each cave in Caves J is situated on a central and very high place on the cliff, and is connected by stairs. It is assumed that a seated Buddha statue would have been situated in Cave J(a), in the centre on the top row. To the west of Cave J(a) is Cave J(b), which probably contained a stupa. Cave J(b) has an irregular square plan and a shallow dome. This cave has four bench-style pedestals carved out along each wall,[6] and on its northern and western walls there are mortises probably designed to hold the Buddha statues. Cave J(g) is similar in form, and its tambour is engraved with a squinch. This squinch is situated lower than those of other Buddhist caves in Bamiyan; nevertheless, it transpires that the design of the squinches carved on the transitional sections of the caves with square plans dates from the early stage of the Bamiyan Buddhist Caves. The domed ceiling with squinches for the square plan is a traditional style dating as far back as Sassanian Persia, and available dating data suggests that this form was used for the Bamiyan caves since approximately the fifth century (i.e. the early stage of the Bamiyan Buddhist Caves).

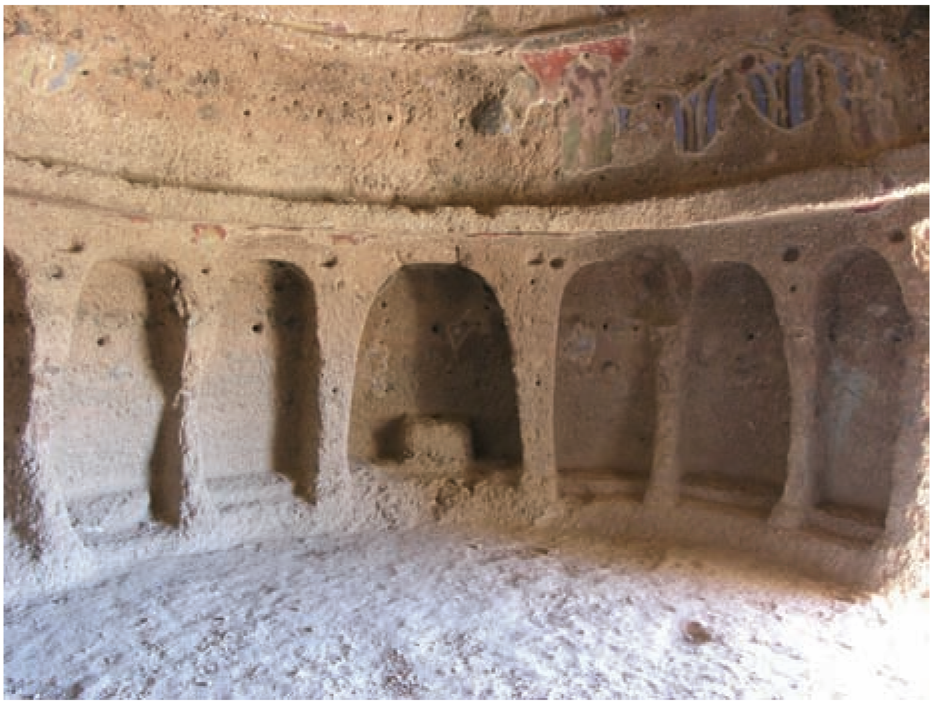


Figure 669 Cave C(a): northern side.

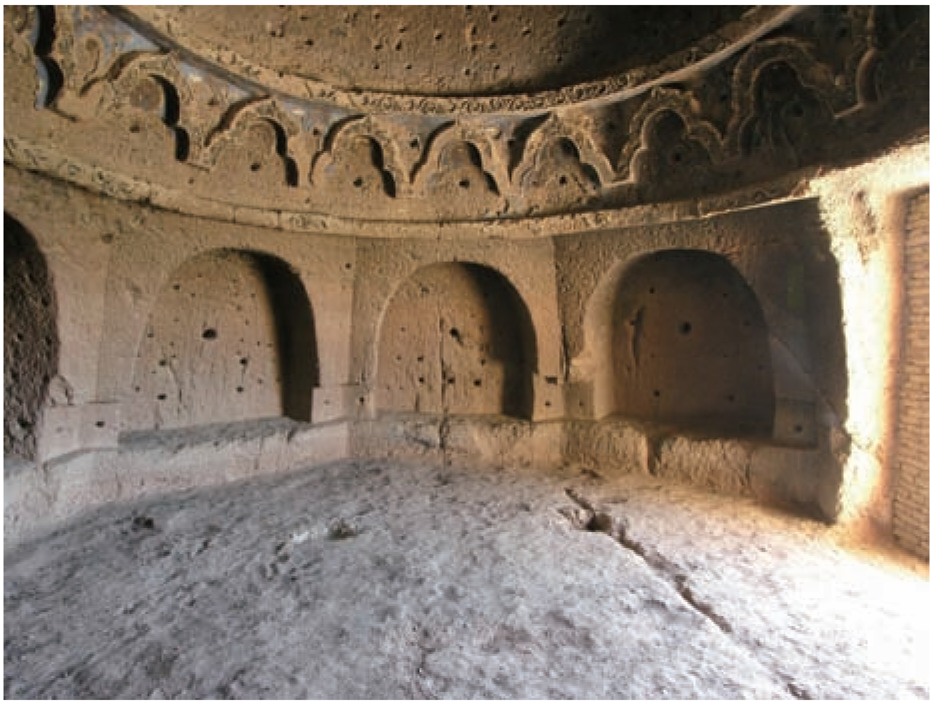


Figure 670 Cave F(a).

Cave C(a) (Fig. 669), Cave C(b), Cave D1 and Cave A Lower(a) all date from the middle of the sixth century to the first half of the seventh century, after the construction of the East Giant Buddha. The first three caves are situated to the west of the East Giant Buddha and still have three-dimensional decorations on their inside walls. The final cave is located to the east of the East Giant Buddha and has the square plan. Cave C(a) and Cave C(b) are aligned side by side and have the circular plan. Cave D1 also has the centred plan with distortions, which is almost a circular plan, and the walls have mortises at regular intervals, indicating that the Buddha statues would have been installed there. The Buddha statues were placed in the niches for Cave C(a) and Cave D1, or settled on the bench-style pedestals along the walls in the case of Cave C(b) and Cave A Lower(a). The bottom of the niche is low and close to the floor, and spindly pilasters were installed between oblong niches next to each other. In addition, the cornices and niches are distorted. Cave C(a) has 15 large niches on the eastern, western and northern walls. It seems that careful attention was paid to the axis; consciousness of the axis is crucial for space design. It will be helpful to perform dating experiments on similar caves, such as Cave B1(c), in the future.

The other features of caves from this period are as follows:

- The number of tambours increases as the thickness and depth of the cornices increases.
- There are various combinations of architectural design elements, such as the cornice, niche and squinch.
- There is more space in these caves compared with caves from the early period.

Period II (Early 7th century–Late 7th century)

During this period, geometrical designs were used frequently on the ceiling and walls, which indicates the diversity of decorations in this period in contrast with the caves of Period I. Cave D, between Caves C and Cave D1 around the East Giant Buddha, has a cross-vaulted ceiling. However, Cave N(a) and Cave S(a) feature the *laternen-decke*. These diverse ceiling plans should be investigated in order to better understand the function of the caves and the effects of cultural influence.

Compared with the caves of Period I, Cave D and Cave F(a) from Period II show a change in the design of the side walls (Fig. 670). Niches on the walls are independently located at a point 40–50 cm above the floor. Tambours are arranged with an arch of serial trefoil figures and three-dimensional arabesque designs made of rammed earth. The pillar between the niches is very short, which highlights the arches of the niches. There are many caves with this combination of niche and pillar in Bamiyan – it might in fact be called the dominant style from Period II.

One cave with a circular plan was found to date from the second half of the sixth century while another with an octagonal plan dates from the seventh century. Some

Table 7 [copy to follow]

Plan type		Ceiling type	Transition part	Example of caves
Centred plan	Square	Dome	Polygonal tambour	35-III, 53-IV, East V(a), T, U
			Cornice(+tambour)	XIV(a), A upper (c), B1(c)
			Only cornice	East III
			Squinch (in tambour)	35-IV, 35-V, A lower (a), A lower (b), B(a), B(f), E(e), J(g), East VI(a), 48
			Squinch (in dome)	F1(a), G
			Corbel	V(c), E(j), J(c), J(b), J(d), 137
			None	53-VI
		Laternen-decke	None	53-V, F(c), F1(b), F3(f), F3(g), H(b), N(a), V(d), S(a)
			Pyramid shape	XV(b), XVI(c), XIII(c)
		Flat	None	F3(a), J(e), J(f), M
	Octagon	Dome	Polygonal tambour	53-III, S(b), S(e), S(h), East II, East IV(a)
			Corrnice (+tambour)	53-I, 53-II, F(a), XI, 52
			Only cornice	53-VII
			Corbel	Z1
		Laternen-decke	Polygonal tambour	35-I, A upper (a), L, R(b), East I(a)
			Corbel	O(a)
		Cross-vault	Polygonal tambour	35-II
			Cornice (+tambour)	D
	Circle	Dome	Cornice (+tambour)	C(a), C(b), D1, XII(d)
		Flat		
Oblong plan	Rectangle	Flat		XIII(a), XIV(a), XIII(a), B1(a), E(b), E(g), F(b), P(b), N(d), N(i), N(h), Q(a), Q(b), Q(c), EastV(c)
		Vault		E(c), E(k), K3, N(c), N(f), S(c), R(e), R(a), V(a), Z(a), XIII(b), East IV(b), XIV(a)
		Cross-vault		B(d)
		Other		134
Cave-niche				I, H(a), E(c), J(a), 50

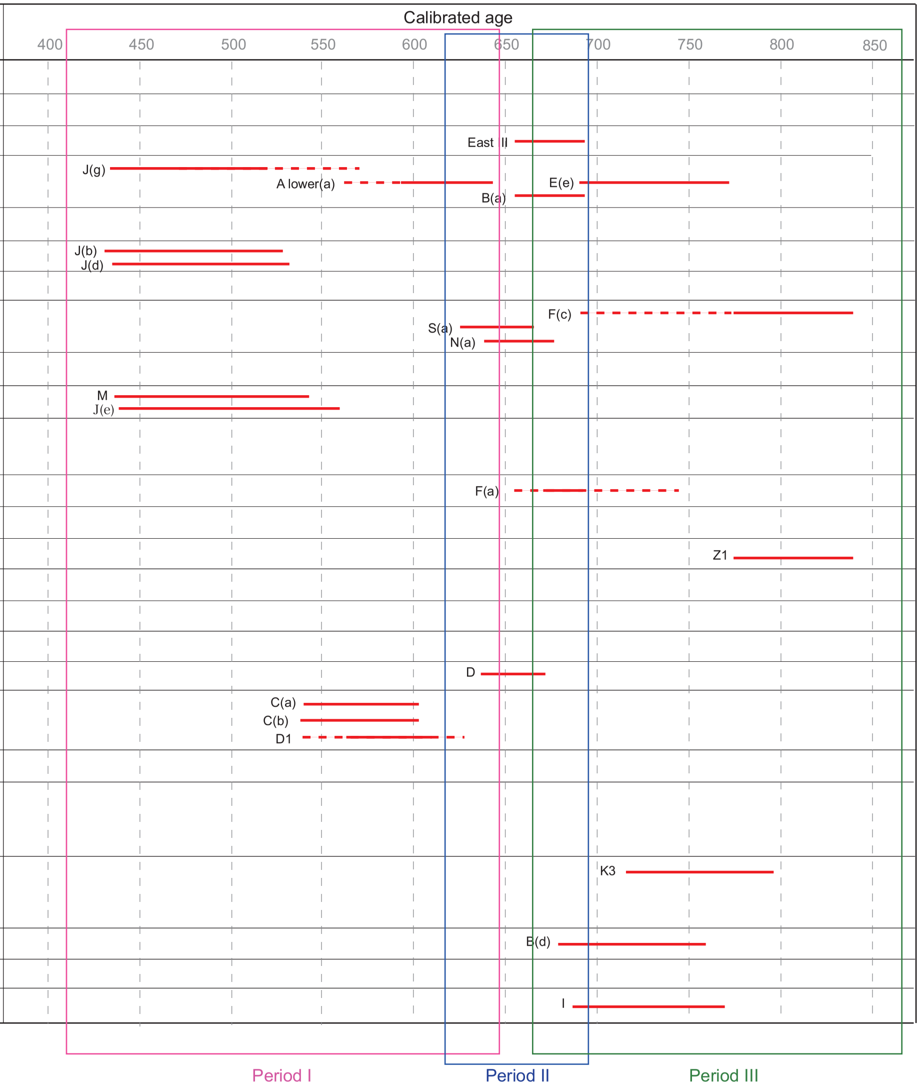
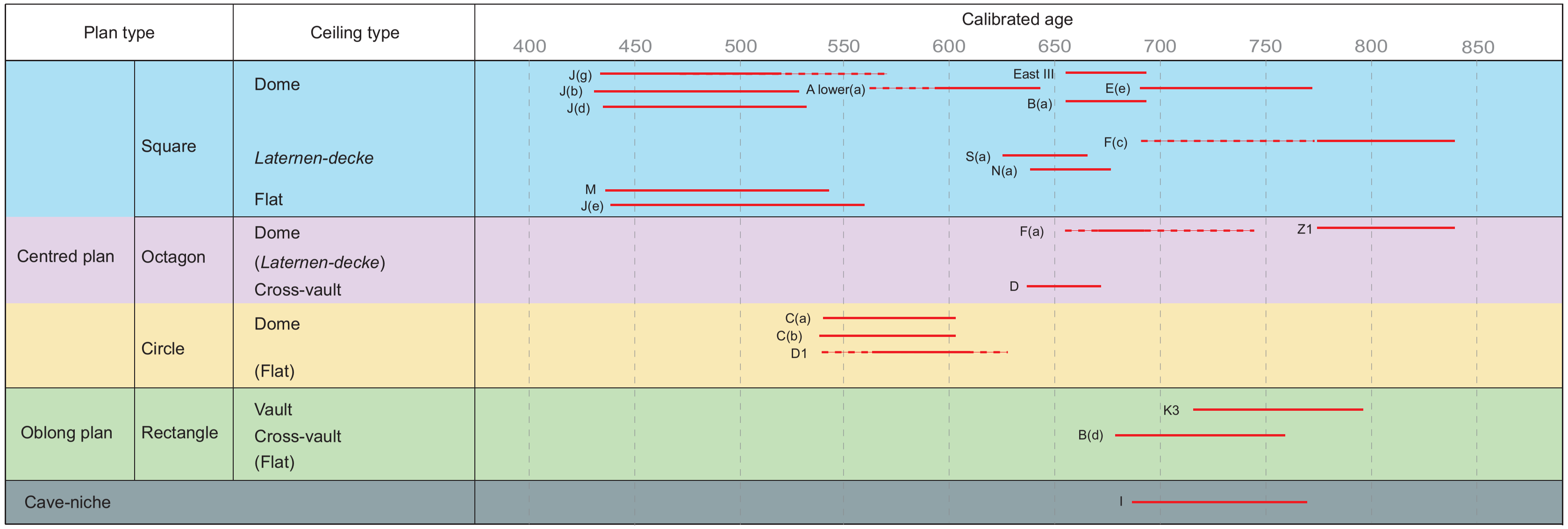
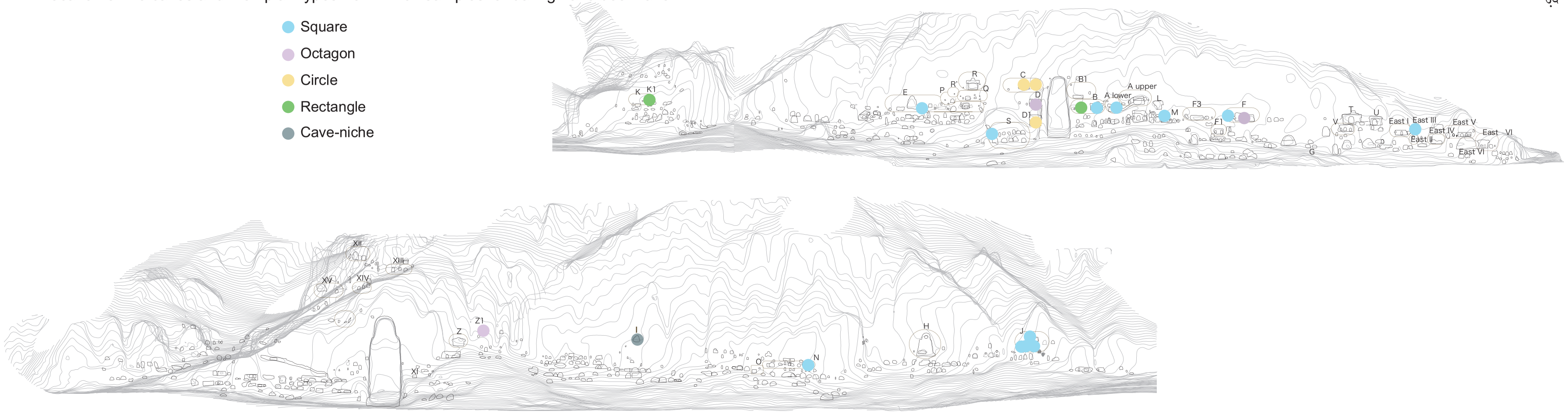


Table 8 Comparison between the plan types of the caves and the results of dating.



( ) means the cave types from which no sample for radiocarbon dating was taken

Location of the caves and their plan types from which samples for dating have been taken.



previous studies have pointed out that the Bamiyan caves with centred plans, such as the circular plan and the octagonal plan, resemble Christian monuments (Yoshikawa 1948: 87). The Eastern Church in the East Mediterranean Basin already had shrines with circular and octagonal plans dating from the fourth and fifth centuries.[7] It is therefore not inconceivable for the caves in Bamiyan, during Period II, to have had circular and octagonal plans.

Period III (Late 7th century–Late 9th century)

Caves dating from after the second half of the seventh century (Period III) have various forms and layouts. Cave B(a) and Cave B(d) are labelled together at the moment. They are, however, from different periods based on the tests; Cave B(d) dates from Period III but Cave B(a) dates from Period II. It is consequently plausible that Cave B(d) was added in a later period. The complicated arrangement created by the position of the stairs and pathway built later around Cave B(d), and also the changes to the cave itself, could be better explained if Cave B(d) was constructed in a later period. Cave B(d) has a unique trapezoidal cross-vaulted ceiling, with a *laternen-decke* at the centre. This feature also indicates a new style.

It appears as if Cave F(c) and Cave F(a) are currently categorised together in the Caves F cluster. However, Cave F(c) is believed to be from Period III, while Cave F(a) dates back to Period II. The former is also situated 2.5 m higher than the latter. The stairs connecting these caves from the front of Cave F(b) are unusually high, which indicates that they were probably built later.[8] Given that these caves were possibly constructed in different periods, it is necessary to reassess the current grouping of the caves.

On the other hand, it is highly likely, on the basis of the connecting pathway, that Cave E(e) belongs in the same group as neighbouring Cave E(c), in which the seated Buddha is located. Cave I with a similar form and space for chanting on the right side of the seated Buddha (called *Unyodo*) also dates to this period. It is very interesting from the viewpoint of cave placement that the seated Buddha statues were dispersed on the cliff a century and a half after the East Giant Buddha was constructed. It will be important to determine the age of Cave H(a), which is the largest cave-niche for seated Buddha statues with *Unyodo* in Bamiyan.

It is the *laternen-decke* of Cave F(c) that is most important from the view of architectural design. Compared with Cave N(a) from Period II, the *laternen-decke* of Cave F(c) has a square timber fixed over the joist, which is a realistic method for constructing wooden structures. Also, it is elaborately arranged with a small dome at the centre. There has been discussion as to whether designs imitating those of structures on land reflect a genuine evolution of construction techniques, or whether they are mere imitations not connected to the actual functions of the caves.[9] According to these results, it seems that the designs reproduce the actual structure. Nevertheless, it is necessary to consider the age of some *laternen-deckes* featuring a more three-dimensional structure, found to the west of the West Giant Buddha, in order to better understand the actual chronology.

Chronology of cave form

Plan

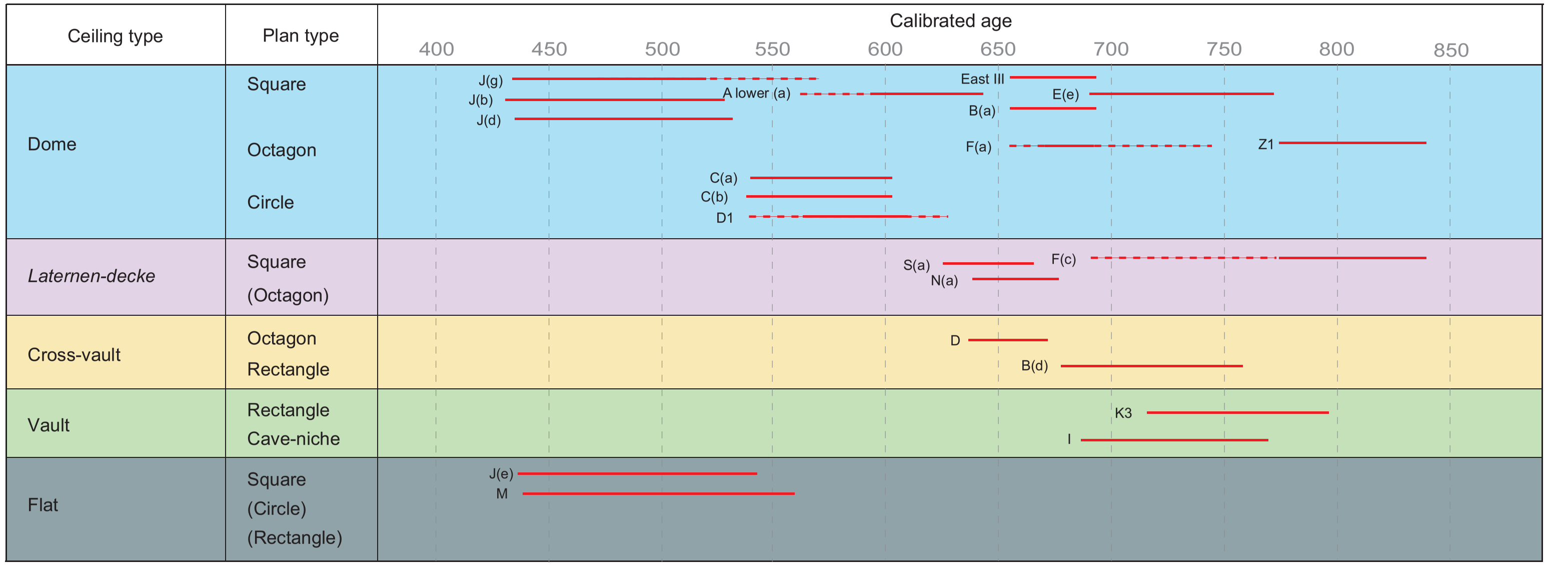
This section discusses the chronology of cave forms based on the results of carbon-14 dating (Table 7). Table 8 shows the calibrated years of the caves with each plan.

It is believed that caves with square plans were widely constructed on the cliff from the fifth to the ninth century, during which period the Bamiyan Buddhist Caves evolved. The combination of the square plan and the domed ceiling, and the square plan and the flat ceiling, can be confirmed from the beginning. The combination of the square plan and the *laternen-decke* appeared from the seventh century on, namely since Period II.

Caves with octagonal plans were built after the middle of the seventh century, the middle of Period II, together with the domed ceiling and the cross-vaulted ceiling. We have not been able to pinpoint the chronology of the combination of the octagonal plan and the *laternen-decke*. Caves with circular plans and domed ceilings were built near the East Giant Buddha, in the middle of the sixth century, from the middle to the second half of Period I. We have only three samples for the octagonal plan and circular plan, and it is unclear if they were constructed before this period.

Caves with rectangular plans normally have vaulted ceilings, which is the most popular combination. Nevertheless, as we examined only caves that retained mural paintings, many caves with rectangular plans were omitted. It is therefore to be noted that it is not appropriate to generalise from the data on the caves with rectangular plans. Cave K3, with a vaulted ceiling, was built in the eighth century, and Cave B(d), with a cross-vaulted ceiling, dates back to between the end of the seventh century and the middle of the eighth century. That is to say, these caves belong to the later construction period in Bamiyan. Having said that, it can also be said that the majority of the caves with rectangular plans would have been created over the course of many different periods.

Table 9 Comparison between the ceiling types of the caves and the results of dating.



( ) means the cave types from which no sample for radiocarbon dating was taken

Location of the caves and their ceiling types from which samples for dating have been taken

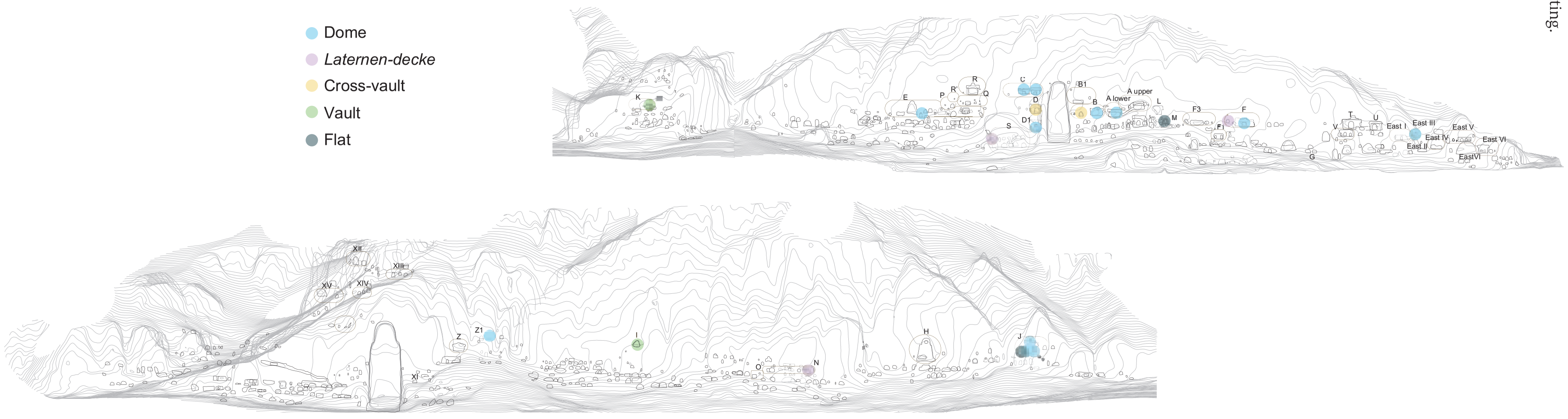
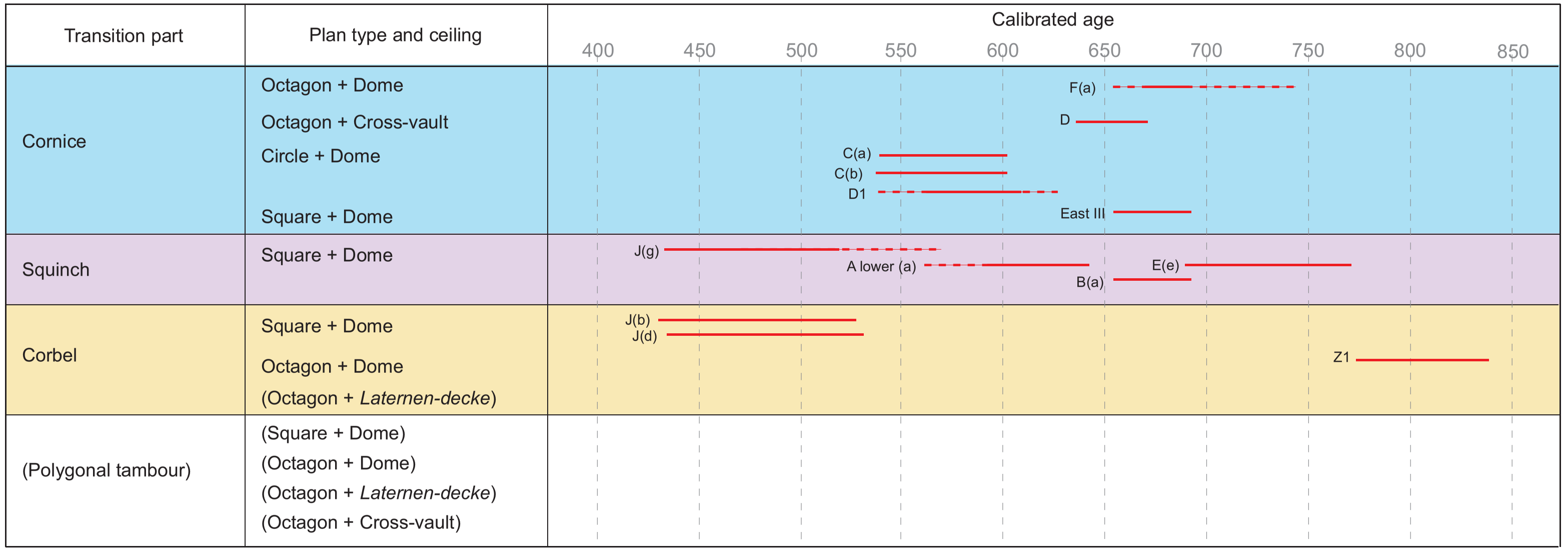


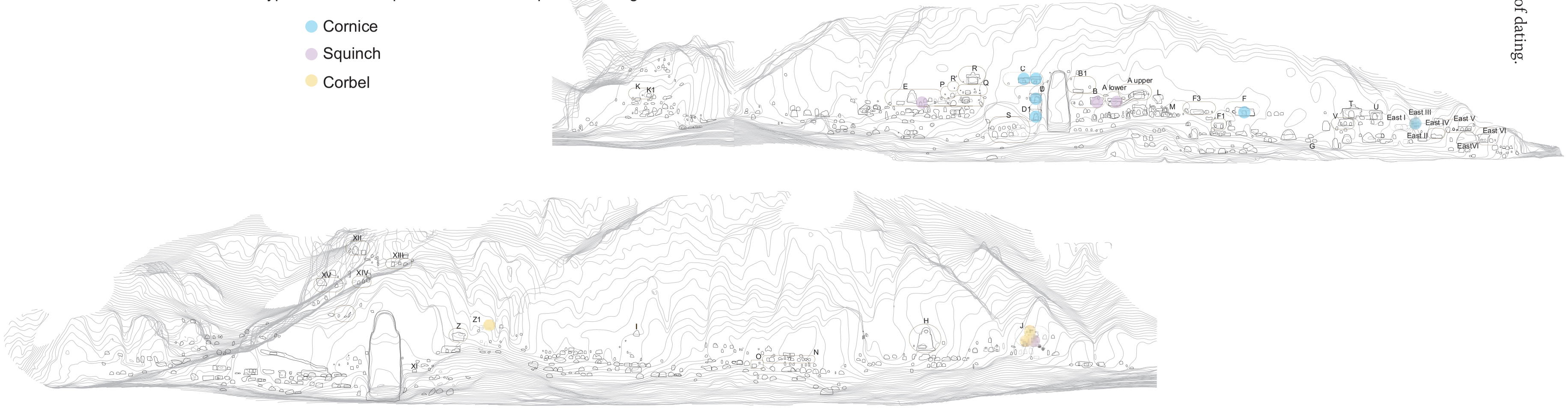
Table 10 Comparison between the transition parts of the caves and the results of dating.



Transition part	Plan type and ceiling	Calibrated age
Cornice	Octagon + Dome	F(a)
	Octagon + Cross-vault	D
	Circle + Dome	C(a) C(b) D1
	Square + Dome	East III
Squinch	Square + Dome	J(g) A lower (a) E(e) B(a)
Corbel	Square + Dome	J(b) J(d)
	Octagon + Dome	Z1
	(Octagon + *Laternen-decke*)	
(Polygonal tambour)	(Square + Dome) (Octagon + Dome) (Octagon + *Laternen-decke*) (Octagon + Cross-vault)	

( ) means the cave type from which no sample for radiocarbon dating was taken

Location of the caves and their types of transition part from which samples for dating have been taken



Among the caves in which the seated Buddha statue is situated, only Cave I has had its chronology confirmed. It is supposed that this cave was constructed between the second half of the seventh century and the middle of the eighth century. This means that the cave was built more than a century after both the East and West Giant Buddhas were formed during the second half of the sixth century. It is necessary to examine when the two caves for the seated Buddha were constructed between the two Giant Buddhas.

Ceiling

The following section discusses the chronology of the Bamiyan Buddhist Caves based on their ceilings (Table 9). Caves with domed ceilings are found throughout the cliff and date back to between the fifth and the ninth century during which the Bamiyan Buddhist Caves were constructed. As with the previous chronology of the plans, the combination of domed ceiling and circular plan occurred after the middle of the sixth century, and the combination of domed ceiling and octagonal plan appeared after the middle of the seventh century. It is believed that the domed ceiling, which had already been employed, was also applied to each plan in this period.

The *laternen-decke* is verified in caves dating from the middle of the seventh century. Although we only have a small number of samples of this type of ceiling, it would not be wrong to say that the *laternen-decke* belongs to a later period of construction in the Bamiyan Buddhist Caves than the domed ceiling, based on the fact that the *laternen-decke* with elaborate decorations in the Foladi Valley dates back to the eighth century. It will also be necessary to examine the *laternen-decke* engraved on the high ceilings of the caves near the West Giant Buddha.

As for the cross-vaulted ceiling, we have only three cases from caves around the East Giant Buddha, two of which date back to between the second half of the seventh century and the eighth century. The cross-vaulted ceiling appeared after Period II, along with the *laternen-decke*, however, the other case, Cave 35-II, is situated at the foot of the East Giant Buddha, which dates back to the middle of the sixth century. While it would have been useful to examine the date of this cave, Cave 35-II, in 2006, it was unfortunately impossible to collect samples of wall clay due to the massive demolition of the East Giant Buddha in 2001.

Only two caves are confirmed with the vaulted ceiling. The first is a niche for the seated Buddha statue, which means that this cave is not suitable for investigating the chronology of the vaulted ceiling. The vaulted ceiling was employed mostly for caves, including the perimeter residential ones, therefore it can be said that this type of ceiling must have endured for a long time. There are very few instances of the flat ceiling; however, the examination results show that they were built from the middle of the fifth century to the middle of the sixth century, in the relatively early period of construction of the Bamiyan Buddhist Caves.

Transitional part

Finally, this section examines the transitional part (Table 10). The transitional part is a device that smoothly connects the square or octagonal plans and the domed ceiling. Therefore, we do not have many samples to examine, except for those caves with the combination of the square plan and the flat ceiling or the *laternen-decke*. Table 10 shows that squinches at the four corners were created over many years, from the fifth to the eighth century. It is notable that they are mostly clustered on the eastern side of the Bamiyan Great Cliff.

In addition to the arrangement of the corners, a cornice and a corbel are other types of transitional parts that form horizontal partitions between the walls and the ceiling. It is deduced from our examination that the corbel has appeared since the fifth century, and that the cornice emerged after the middle of the sixth century. However, it should be pointed out here that we have examined mainly samples from the caves with octagonal and circular plans, combined with cornices. It is necessary to obtain test results from more caves with the combination of square plan and cornice. This examination is now in progress.

We have one more transitional part to discuss: the polygonal tambour. This tambour was used in order to increase the number of chamfers needed to transition from the square or the octagonal plan to the domed ceiling. We have been waiting for the dating results from the samples collected during our mission in 2006 to facilitate a future investigation of the caves with polygonal tambours.

Summary

It is possible, as mentioned above, to demonstrate the probable chronology of the caves based on the dating of the wall clay from mural paintings, even though we only have a small number of samples. It can be said that the certain caves were constructed at roughly the same time, without concentrating on specific areas for each period. Sometimes, caves with different features are located next to each other because they connect caves built between them in later years, such as Cave B(d).

It would appear that some cave forms were constructed throughout many decades, and even centuries.

Nevertheless, judging by the architectural features, the caves share similar tendencies with the mural paintings, which were at their peak construction around the seventh century.

It should be admitted that the number and variety of samples for testing cave chronology by carbon-14 dating are very small. We have already collected alternative specimens as a supplement.

It is expected on the basis of the examination of these that we will be able to investigate the correlation between the diversification of the cave plans and cave functions, and the interrelationship between the three-dimensional architectural designs and the mural paintings inside the caves. It is necessary to study the caves from broader perspectives in order to re-examine their chronology.

Notes

1. Only Cave 134 shows this form, however the process could have evolved to the centred pillar cave.
2. In Tapa Sanawbar, to the southwest of Ghazni, it is believed that timbers are placed on this spot as corbels on which the cornice is arranged (Verardi and Paparatti 2004: 45).
3. During the eighth mission in 2007, NRICPT and OYO Corporation conducted geological surveys including the geological boundary of the Bamiyan Great Cliff.
4. Su 1983: 168; Dunhuang Academy China 1980: Appendix.
5. Kodera *et al*. 1971: 20–21. This report categorises the plans in the following manner: '2. Great stone Buddha statue (53 m cave-niche and the surrounding caves, 35 m cave-niche and the surrounding caves)', 'Caves with a central focus on seated Buddha statue (I, H, E(i), XII, J)', 'Independent caves (XI, Z1, D, D1, T, U, L)', 'Caves with a central focus on octagonal and circular plan (C, F, A, R, East I)', 'Caves with a central focus on square plan (W, A, B, J, East VI, East V, F3, F1)', 'Caves with a central focus on rectangular plan (B1, Z, V, East III, P, O, East II, XIII, XV, XVI)'.
6. Only the eastern pedestal is higher and deeper (eastern pedestal: ca. 50 cm high, the others: around 20 cm high; eastern pedestal: 65 cm deep, the others: 40 cm deep).
7. After Nestorius was removed at the First Council of Ephesus in 431, many Nestorians centred in the East Mediterranean Basin moved to West Asia and Central Asia. It is known that they were authorised in China in the seventh century.
8. The ceiling of the entrance to the stairs in front of Cave F(b) is currently 140 cm high. It is therefore impossible to pass through without crouching.
9. Yamada 1984: 235; Kuwayama 2002: 80.

Chapter 9 Caves: current situation and site management

Current situation of caves: issues

Our examination of the present condition, along with other significant details, of the Bamiyan Buddhist Caves reveals various issues that need to be addressed in terms of site management (Table 11). Current problems in the caves consist of natural processes such as weathering around the cliff surface, falling bedrock, and cracks on the bedrock, as well as alterations caused by human activity including demolition and alterations added in later years. Some problems have been accelerated by a combination of natural and human factors. As for site management, there has been insufficient recording of cave details, which are crucial for the future administration of the site. Furthermore, the names of the caves are not standardised, and many caves do not have pathways that provide sufficient access. This chapter provides the details of each issue.

Table 11 Issues of site management in the Bamiyan Buddhist Caves.

Features			Examples
Present condition	Weathering and collapse	Weathering of rock surface, stairs and corridors	
		Collapse of bedrock	Bedrocks around Caves S and XI, etc.
	Cracks	Huge cracks caused by bedrock structure	East III, 52, F(a), F(c), S, E, K, H(a), H(b), N, I, Z, XV(b), etc.
		Cracks inside caves	
	Demolition	Damage by the explosion and its after-effects	Lower caves of the East and West cave-niche, D.
		Bullet holes	I, Forecourt of T
	Alterations in later years	Alteration of the corridors and entrances	East I(b), East I(c), F3(a), F3(c), 123, A lower, B(g), 134, E, N
		Holes on the floor, partition of the rooms	U, T, L, A lower(a), 134, B(a), D, etc.
		Racks, niches and windows	T, A lower(c), B(c), B(d), etc.
		Repainting of the walls and floors	Walls: T, F3(c), L, E(g), E(h), J(b), etc.
			Floors: East II, F(a), F(c), K3, I
Issues for site management	Survey maps of the caves	Caves reformed from past measurement plans	Caves around the East and West cave-niche, etc.
		Caves without measurement plans	East V, 41~52, F1(a), F1(b)
	Monitoring of cracks	Observation of the location of cracks and regular observation of the crack gauges	All caves, especially those in which the crack gauges are installed
	Review of caves' names	Unification of cave names or numbers separately adopted by each expedition team	All caves
		Examination of the given grouped cave names with actual equipment of the cluster of caves	All caves
	Selection of caves for opening to the public	Removal of landmines, safety and access	

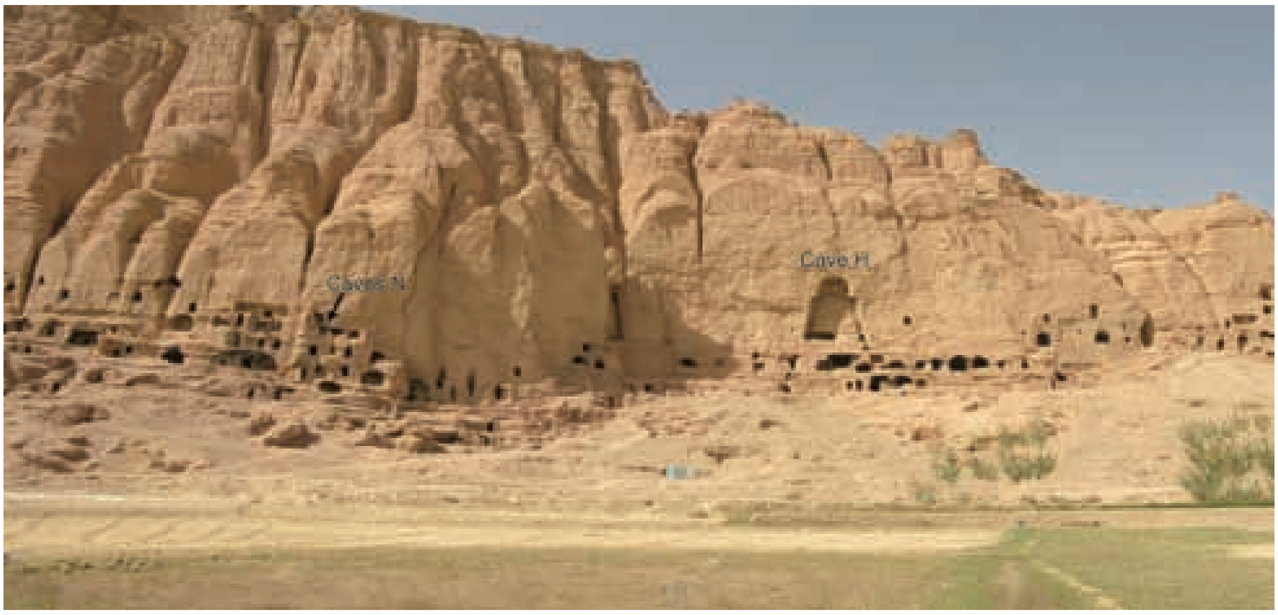


Figure 671 Gully erosion on the cliff surface (left: around Caves N) and vertical parts (right: around Caves H).

Weathering and collapse

As the bedrock of the Bamiyan Great Cliff is composed of silt or pudding stone, it is very fragile and the surface is severely weathered. The clay wall covering the face of the cliff originally protected the bedrock from natural decay; however, it is almost entirely exfoliated and has lost its function over the years. Even the caves and stairs still in good condition have lost their mural paintings, resulting in the clay wall also being lost. The pathways and the surfaces of the stairs have also deteriorated because of weathering and pedestrian traffic.

Falling bedrock is a significant threat to the caves. The debris from fallen bedrock has accumulated around the foot of the Bamiyan Great Cliff, making the condition of the caves there even worse. Recently, what seems to be fallen rubble has been confirmed around the entrance of Cave XI. It is plausible that these collapses would have been caused by the cave construction itself, in addition to other natural processes. The interior of the bedrock contains many cracks, as detailed below. These cracks are presumably connected to cliff erosion.

Cracks

Our mission has revealed that many Buddhist caves in Bamiyan, for example the caves around the foot of the East Giant Buddha, have cracks apparently caused by demolition and various other factors. On a smaller scale, cracks also run inside the caves. Some major cracks were created by the bedrock structure itself. The numerous cracks around the Bamiya Buddhist Caves are a prime concern for site management in terms of conservation and public safety.

Large cracks caused by bedrock structure

The Bamiyan Great Cliff is almost entirely vertical and its surface is very fragile, as previously mentioned. The surface has gully erosion (Fig. 671) and the vertical face has been exposed by falling bedrock (Fig. 672). The debris is deposited around the foot of this cliff. It should be pointed out that Cave H and the entrance to Cave J(a), in which the seated Buddha is carved out, are arranged with some decorations on their rims. This probably means that the vertical surface already existed at the time of the niche's construction. Observed from the side, one can see a very large crack that runs parallel with the cliff behind the surface, and it appears as if the cliff surface has been exfoliated. This situation is also found behind Cave I, Cave H, Caves N, Caves S and Caves J, and some of the cracks extend inside the caves (Figs 673, 676). This is a structural bedrock problem that needs to be solved before conservation can be carried out. Research is urgently needed in order to provide specialised observation of the cracks for safety control and conservation work.

Paleoseismic research shows that the Hindu Kush Mountains, on which the Bamiyan Great Cliff is located, contain the rather large Herat Fault, and that this area has suffered many large earthquakes in the past.[1] It is necessary to include the influence of earthquakes in the discussion of significant cliff collapses in Bamiyan during its long history.

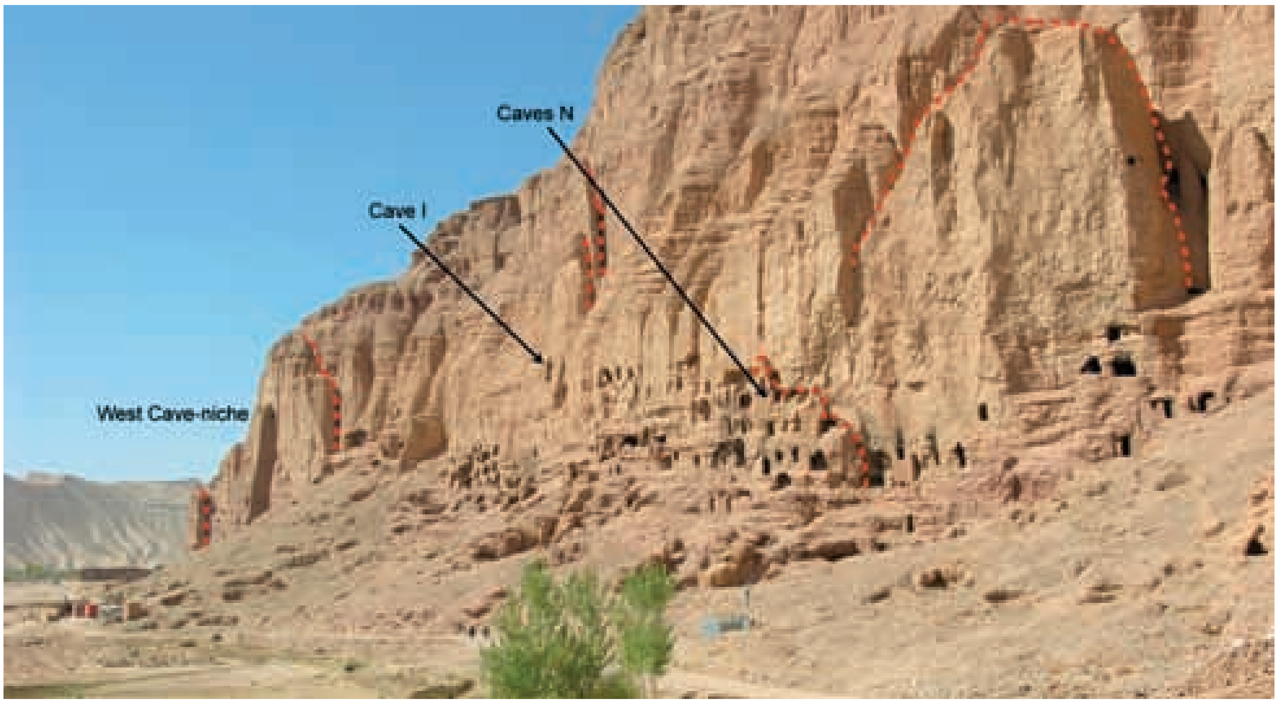


Figure 672 Bamiyan Great Cliff (western cliff): cracks on the surface.

It is thus apparent that the cracks caused by the geological structure of the cliff are a serious problem for the Bamiyan site. Given that the caves are constructed on this type of bedrock, we must take into consideration the mechanism of the cracks' fluctuation on the bedrock when establishing a conservation programme for the caves. It is most important to understand and locate the unsafe portions of the bedrock in light of ongoing geological research.

Cracks inside caves

Many severe cracks have also been found inside the caves. Huge vertical rifts that parallel the cliff surface have been caused by natural conditions, namely the previously mentioned bedrock structure (found in caves such as Caves S, Caves N, Caves E and Cave I). Many short cracks have also been found, which is unique to siltstone. The widest point of the largest crack measures 50 mm. Caves S, which are situated away from the current cliff surface, even have rifts measuring 25 cm in the back of some the caves.

The demolition was one of the most significant human activities that created cracks in the caves. As detailed in Chapter 3, a new crack measuring 4–5 mm at its widest point has been found in Cave D. Cave C(b) has a rift, 7 mm wide at its widest point, in the eastern side near the niche. In addition, many cracks that run parallel with the cliff surface, caused by the construction of the caves, have been found around the top of the domed ceiling (Cave B1(d), Cave B(a), Cave East II: Fig. 679), the top or

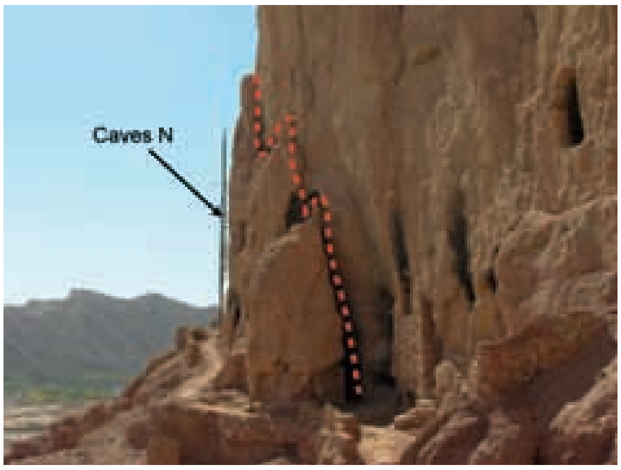


Figure 673 Cracks around Caves N.

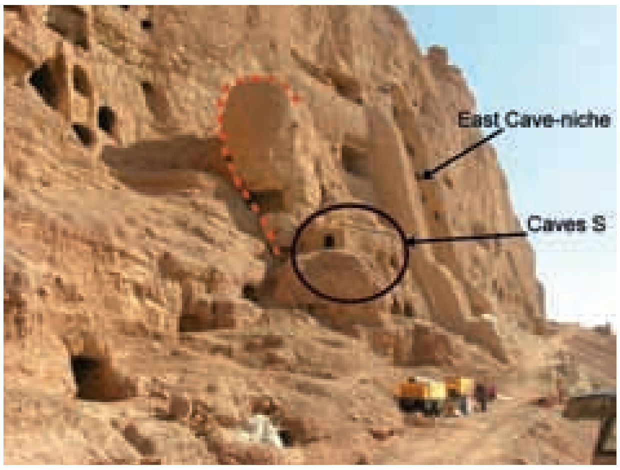


Figure 674 Cracks around Caves S.

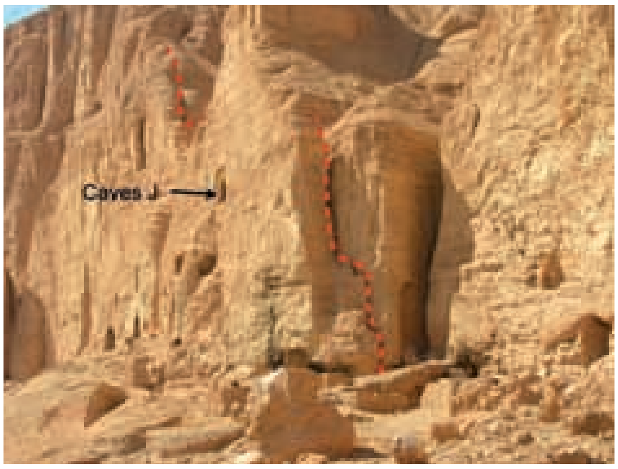


Figure 675 Cracks around Caves J.

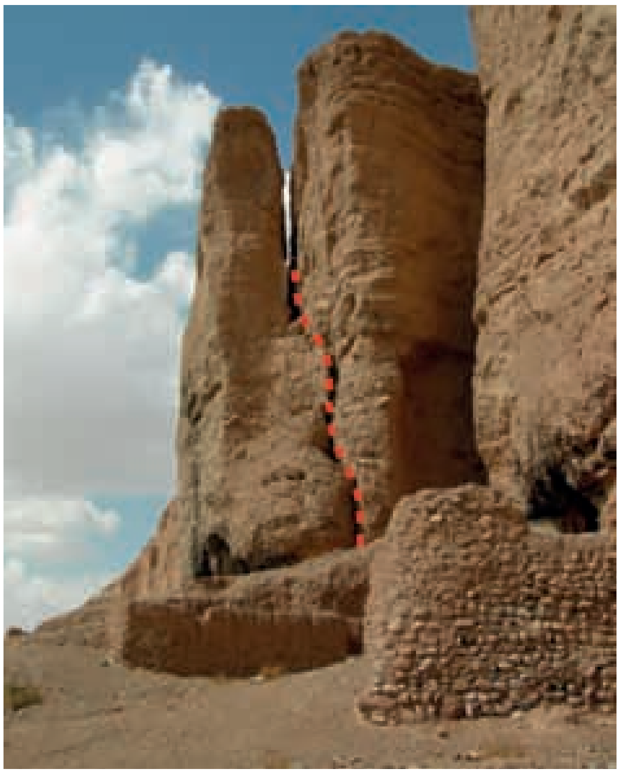


Figure 676 Cracks on the western surface of Caves J.

shoulder of the entrance (Cave A Lower(a), Cave B(a), Cave D1, Cave XI: Figs 677, 678), and the ceiling of the forecourt. As for the entrances and windows, cracks often run at a right angle to the entrance at the centre of the arch on top. The redistribution of stress caused by the construction of the caves seems to be one of the reasons for these cracks.

Structural issues tend to be underestimated when caves are constructed because we believe that we can freely arrange the space as we wish. It is, however, apparent that stress is a crucial factor to be considered for cave construction, just as it is for buildings on land.

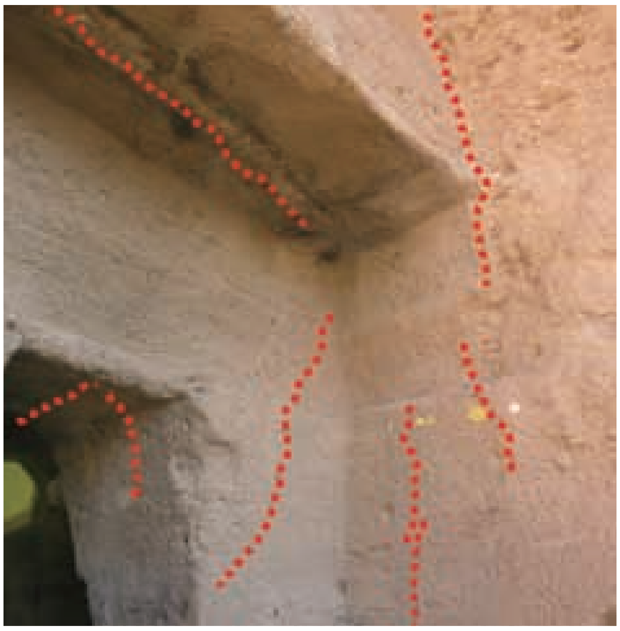


Figure 677 Cave D1: cracks around the entrance.

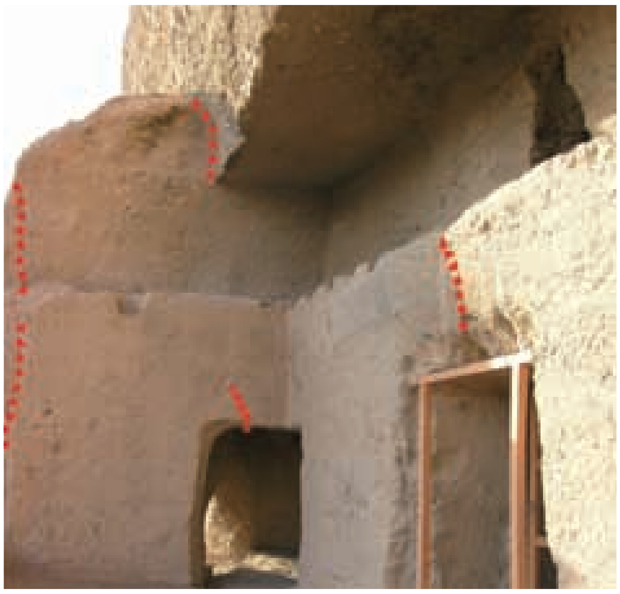


Figure 678 Forecourt of Cave A Lower(a): cracks on the shoulder of the entrance.

Some mural paintings and unbroken wall clay were found covering cracks as wide as 40–50 mm (Cave 1, Cave K3, Cave 137: Fig. 680). These cracks are clearly very old and the wall clay was applied over them. During the mission, we recorded these cracks and the stages of their development. For the most noticeable cracks, their locations and configurations were documented as pictorial data via drawing and photography. Furthermore, we set up a displacement meter in 2006 to monitor the cracks in the most architecturally important caves. These cracks are large and at risk for future displacement. We will need to continue monitoring the displacement and extent of the cracks.

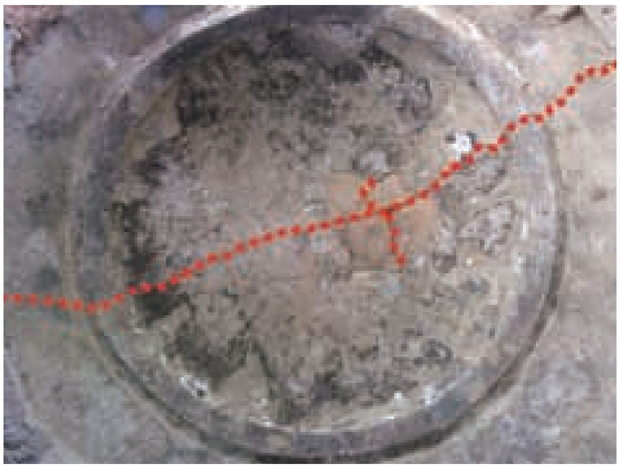


Figure 679 Cave East II: cracks on the ceiling.

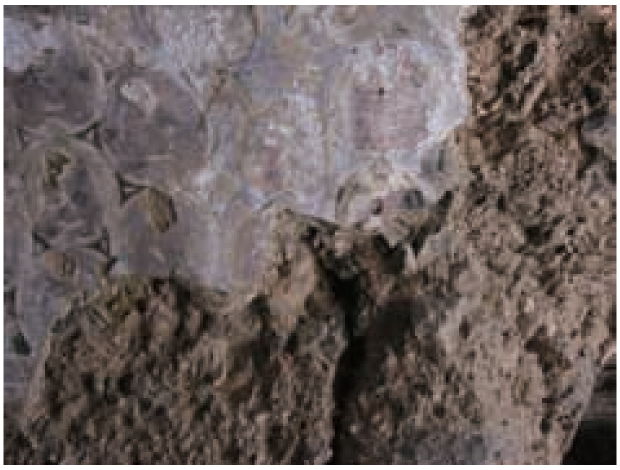


Figure 680 Cave K3: mural painting covering cracks.

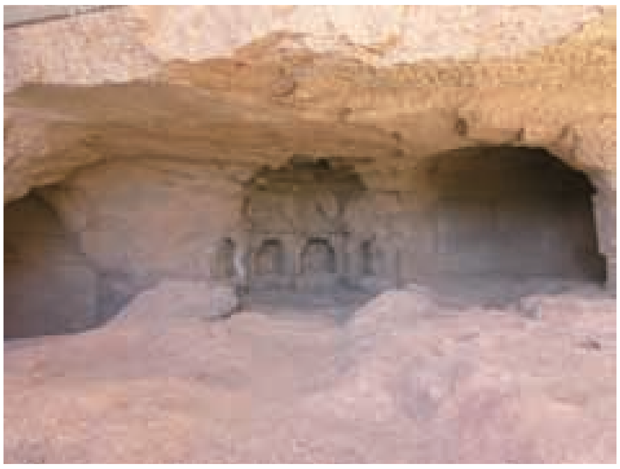


Figure 681 East Giant Buddha: caves around the foot of the cave-niche.

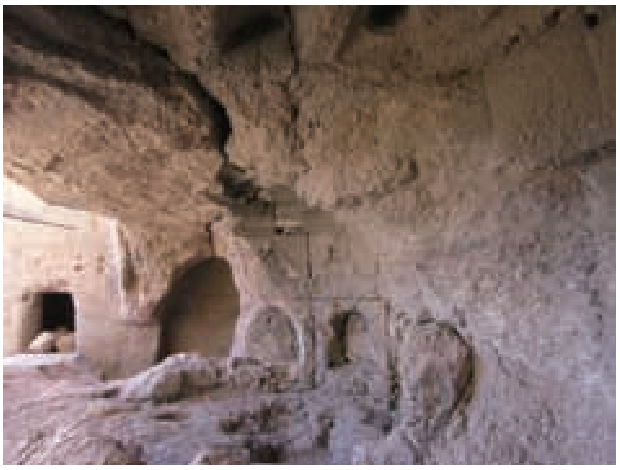


Figure 682 View of Cave 35-I from Cave 35-II.

Demolition

Both the East and West Giant Buddhas were demolished. Compared with the area surrounding the West Giant Buddha, that of the East Giant Buddha was more severely affected (Figs 681, 682). Archaeological Survey of India (ASI) executed restoration and reinforcement projects for the East Giant Buddha in the 1970s, during which the caves at the foot of Giant Buddha were strengthened by reinforcing steel on the walls. This steel is currently exposed because of the demolition (Fig. 683). Moreover, some caves, such as Cave D near the East Giant Buddha cave-niche, exhibit significant effects from the demolition. Cave 35-I and Cave D have new cracks that were not found in the photographs taken in the 1970s (Figs 47, 50). Also, many cracks were verified around the East Giant Buddha, which means that geological specialists must investigate the causal connection between the demolition and the cracks.

It should be pointed out that there are still land mines around the Bamiyan Great Cliff, hidden during the civil war. Even if the de-mining operation has been completed in one area, there remains a possibility that other mines may have descended with snowmelt from the upper cliff, therefore the risk still exists. Removing all of the land mines is one of the most important tasks for facilitating safe research activities, both in terms of conservation as well as of the collection and distribution of information on the caves.

Alterations in later years

Some caves were used as residences in later years and still retain traces of this function, including windows, ventilations, holes in the floor for ovens and partitions. Furthermore, entrances and corridors were added to caves that were originally connected horizontally, for example Caves E and Caves N, in order to expand the residential space (Fig. 685). A large number of caves that lost their accesses due to the cliff collapse can be reached via new access routes bored through the wall.

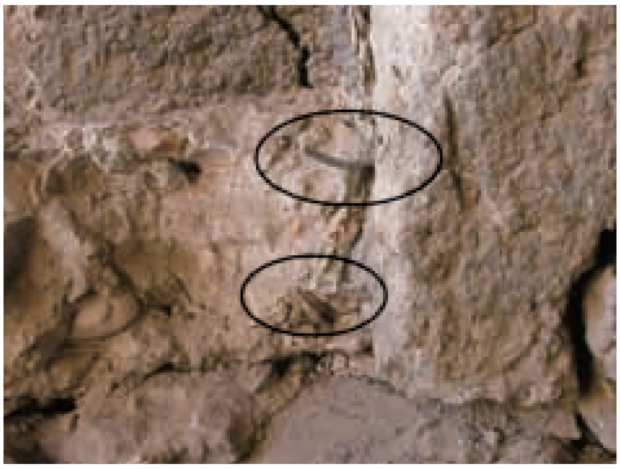


Figure 683 Cave 35-I: trace of reinforcement work with steel by ASI.

The potentially original entrances had doorframes on the bedrock; in contrast, new entrances established later have no frames and many were roughly built. In order to understand the original cave locations, we must know whether or not the corridors were added in a later period.

Surface changes have also been verified inside the caves, including later recoating and black soot on the walls. In some caves with black soot, colours were found on the wall surface after the black soot fell down (Cave East I(a), Cave East I(c), Cave F1(a), Cave 137). Blue-grey colour was applied to the lower half of the wall of Cave J(e), and it is rimmed with colour in the shape of a relief. As it is unique to this cave, this was probably an alteration caused by reuse of the cave in later years.

Issues for site management

Survey map of caves

It is necessary to prepare a survey map of the caves at a certain level for documentation of the present condition and future management. As for Bamiyan, although previous missions produced drawings for the major caves, there are not sufficient survey maps for research on the present condition. In 2003, PASCO Corporation measured the caves in which mural paintings remained,

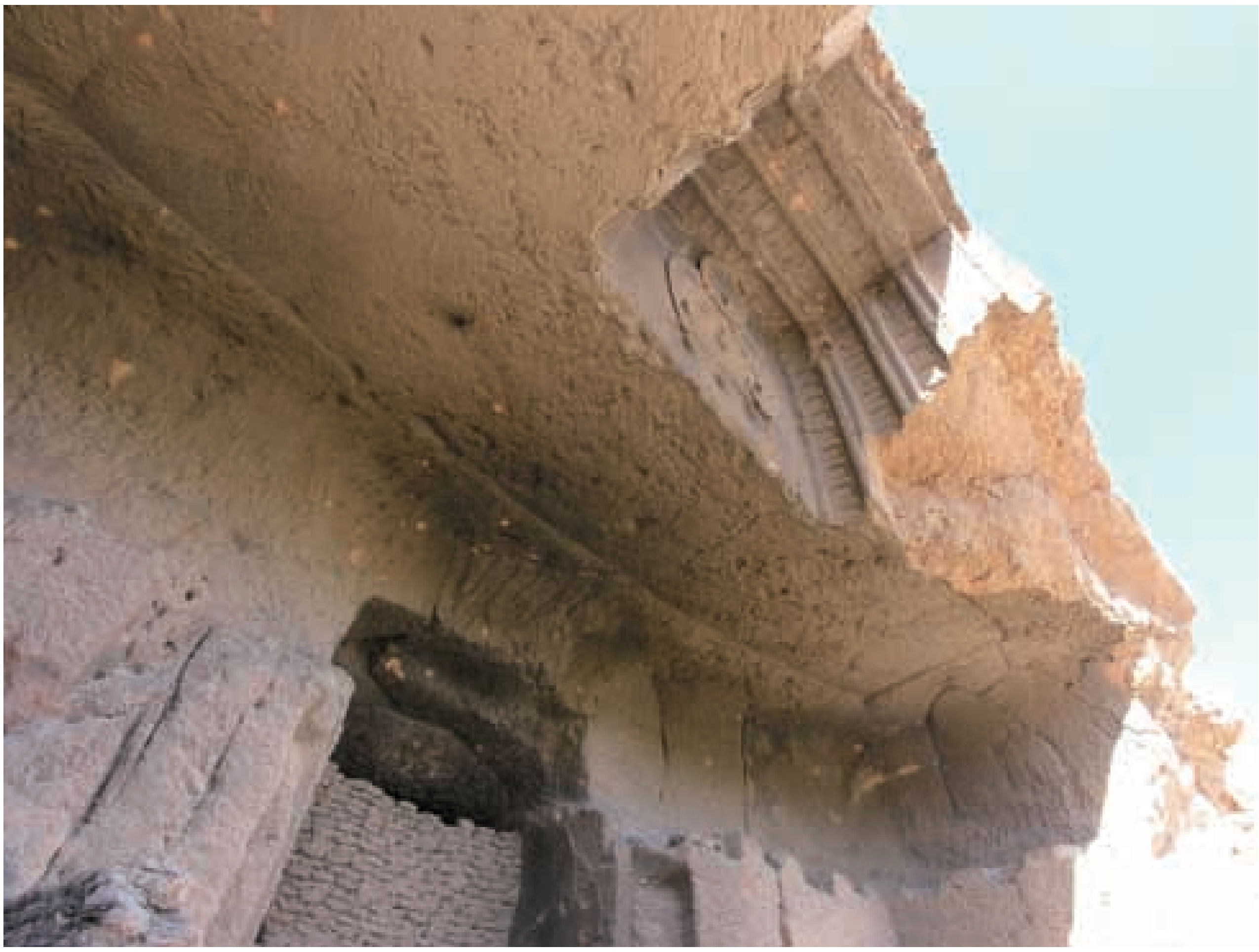


Figure 684 Cave T: trace of bullet.

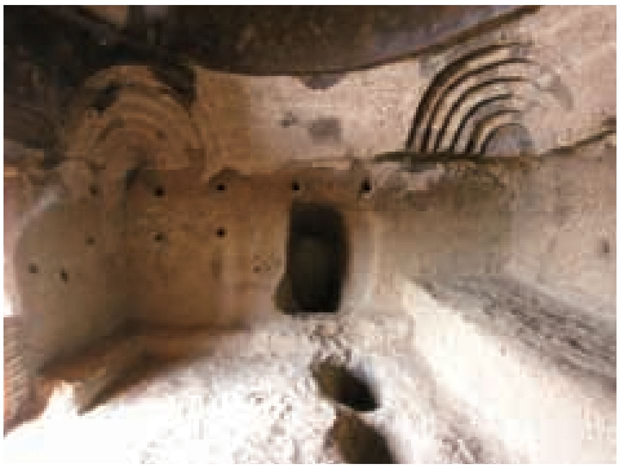


Figure 685 Cave A Lower(a): changes in later years – holes in the floor and entrance on the western wall.

and then drew a high-quality survey map. It is necessary to continue to produce survey maps of the most architecturally important caves.

Our mission revealed some differences between maps created by previous research and the caves' present condition. These discrepancies were either caused by collapses of the cliff that resulted in changes on the surface, or errors in the old survey maps themselves (Cave 35-IV). It is, however, worth noting that previous maps sometimes indicated inaccurate and approximate locations of the caves. Therefore, it is necessary to produce an accurate map for recording the present condition of the caves as well as pictorial recording. Stairs and corridors that were not documented in previous studies should also be recorded; those confirmed in 2006 were recorded in the elevation. Furthermore, 3D techniques should be employed for the most accurate documentation and drawings. It is necessary to detail this together with actual measurements.

Review of cave names

With regard to the names of the Bamiyan Buddhist Caves, each expedition team has employed different terms up until this point. Nagoya University teams have mainly adopted the alphabetical notation following the French mission; however some of them are in disagreement with

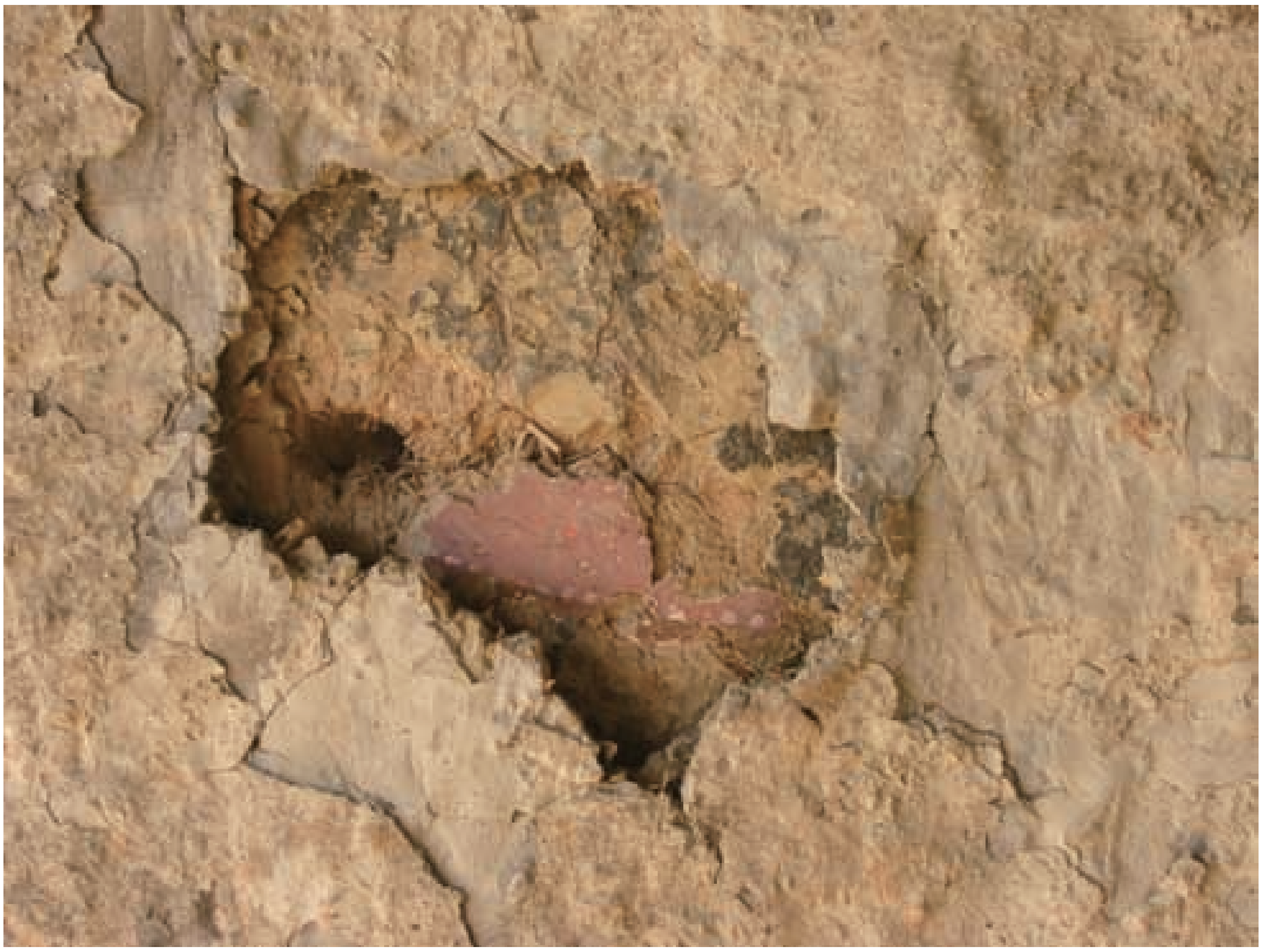


Figure 686 Cave East I(c): paint layer under the recoating on the western surface.

those of other missions. Kyoto University has systematically numbered the caves from east to west. Our mission uses both methods of naming the caves: we mainly follow the alphabetical terms from the French mission and Nagoya University, and for those caves not allocated alphabetical names, we use the numbers assigned by Kyoto University.

In addition to the complicated situation of cave names, our mission revealed the necessity for reassessing cave clusters. Examination of the caves' connecting components, such as corridors, entrances, stairs and forecourts, indicates that caves as they are currently grouped may have originally formed different cave groups. For groups such as the French mission and Nagoya University, the clusters of caves were a crucial element when naming each grouped cave.

Now that site conservation, surveys and research have been executed on an international level, it is necessary to integrate the terms used for the Bamiyan Buddhist Caves. It is therefore necessary to review the grouped caves and consolidate the method of distinguishing a front room and a forecourt.

Selection of caves for opening to the public

We wish to make a plan for site management that includes the future opening of the caves to the public in keeping with the Bamiyan Remains Preservation Business. We would like more people to understand the academic importance of this site and the conservation project. For this purpose, there must be an academic evaluation, safety must be a priority (removal of land mines in particular), and access must be improved.

As mentioned above, the caves on the lower surface of the Bamiyan Great Cliff, which were severely damaged by collapses, have lost their corridors, stairs and even in some cases their very structure. Therefore, many caves on the upper surface of the cliff have no access points, even though the caves themselves remain in good condition. If any stairs still partially exist, the surfaces of the stairs are so worn that it is too dangerous to use them as pathways. The bedrock of siltstone and pudding stone is very fragile and the risk of collapse has increased.

Currently, for reasons of safety, it would be realistic to only gradually open the caves to the public. Under the circumstances, the caves around the East and West Giant Buddhas, and Caves J between the two Giant Buddhas, could possibly be opened. In addition, Cave N and Cave I are candidates for public access after the restoration works on their mural paintings have been completed. Nevertheless, it will be necessary to establish a safe approach since these two caves are located at a relatively high position.

Note

1. Ambraseys and Bilham (2003) document the earthquakes in Bamiyan from AD 734 to 2002.

Chapter 10 Conclusion and perspectives

Following our 2005 mission, in 2006 we exhaustively examined the present condition of the Bamiyan Buddhist Caves from an architectural viewpoint for the first time. The results should be primary data for site management, especially for understanding how to best open the site to the public while still guaranteeing public safety. The bedrock structure is clearly a fundamental issue for understanding the causes of the damage suffered by the Bamiyan Buddhist Caves that were originally constructed on a fragile rock bottom. We must produce a plan for the conservation and management of the caves, from a long-term perspective, in association with geologists. Based on our 2006 investigation, we have determined that we need to focus on the following topics to enable us to move forward.

Analysis of the architectural features

Form, technique and design

Our survey of the location of the caves should enhance analysis of the following three issues: it will help us to understand the architectural characteristics of the Bamiyan Buddhist Caves, the relationship between cave-niches (or evenly spaced niches for seated Buddha statues) and their surrounding caves, and overall issues of technique and design. We will also undertake a comparative research study of the surrounding sites. We believe this research will produce academically valuable knowledge of the Bamiyan Buddhist Caves.

Chronology

It is necessary to consider the chronological order of cave construction when examining their architectural features because the Bamiyan Buddhist Caves were built over the course of several centuries. We have therefore collected samples for carbon-14 dating in order to supplement the analysis of the caves from the viewpoint of art history with a scientific investigation. We thus intend to examine the chronology of the Bamiyan Buddhist Caves in a comprehensive manner, both from the viewpoint of art history and in light of the results of carbon-14 dating.

Site management

Survey map for documentation of the present condition of the caves

Along with documenting the present condition of the caves, we will also continuously prepare updated survey maps necessary for future site management. It will also be very useful to create an interior elevation in addition to the breakdown of the cave's many components, in order to document the cave's cracks and damages. The existing maps are listed in Appendix II. We do not have survey maps derived from precise measuring equipment for all of the caves.

In 2007, we made a survey of the most important caves, which was followed by delineating each cave's 'location', 'plan', 'section', and 'ceiling', in order. Nonetheless, there are some technical problems that need to be addressed before a survey can be properly conducted. It is necessary to improve our skill in surveying caves in difficult conditions. For example, in the cases of Cave XI, Cave T and Cave U, it is difficult to examine these caves with a laser because the black soot on the cave interiors absorbs the emissions from the laser. There is also insufficient lighting for photographic documentation. It is therefore necessary to revise the survey method for these caves.

Crack monitoring

There are some serious cracks inside the caves because of the bedrock structure and the redistribution of stress that occurred after cave construction. In some respects, these cracks require as much attention as the caves themselves. The problem of the cracks must be solved in order to ensure safe conditions for conservation work and the security of future visitors. It is necessary, in collaboration with geologists, to analyse the cracks found during our mission for causes and possible displacement, which will form the primary data for future site management.

Renaming of the caves

The inconsistency of each research team's system for naming the caves needs to be addressed as the conservation work has been conducted internationally. While the French mission and Nagoya University have allocated alphabetical names, Kyoto University named them numerically. The alphabetical titles issued by the French mission have traditionally been employed for research on Bamiyan; however, now that the number of caves has increased, each mission has given a different name to these new caves, causing problems for researchers. Moreover, we have realised that the manner in which neighbouring caves, such as Caves E and Caves N, were grouped during previous missions does not work for all of the caves. As we have already pointed out, the present titles do not necessarily fit the context of the original construction of the caves.

It is necessary to establish common rules for naming the caves. At present, some spaces such as stair landings, forecourts and front rooms are given specific names, but other spaces are not. The ideal would be to name these chambers with simple and standardised terms. For this project, we must continue to research cave locations in order to understand the function and position of each cave. We can then evaluate appropriate terms for the caves.

Selection of caves for opening to the public

One of the most important issues in the near future is selecting suitable caves for opening to the public, based on the results of our survey and the progress of our conservation work. There are many safety issues to be resolved at the current time. It is therefore reasonable to open the site to the public gradually, section by section. The caves that could be opened should be determined based on their academic characteristics while also taking into account such crucial issues as cliff maintenance, safety on the basis of geology, and the ability to access each cave. Under the circumstances, the caves around the East Giant Buddha could possibly be opened to the public, although this certainly depends on the preparedness of the relevant institutions.

Most importantly, safe access (including stairs and pathways) to the caves must be provided without detriment to the landscape before they can be opened to the public.

Afterword

The Bamiyan Buddhist Caves are known worldwide because of the demolition of both the East and West Giant Buddhas in March 2001. After this tragedy, the Bamiyan site was inscribed on the World Heritage List and the List of World Heritage in Danger, which initiated a new era for the site. Inscribing the Bamiyan site on the World Heritage List ensured that the site was recognised as part of the shared property of mankind, rather than as a cultural heritage particular to Afghanistan. To enhance the value of the site, we have to define and inform the world of its value and of the Buddhist caves. It is possible to clearly establish the Bamiyan site as a site of cultural heritage, and thus encourage its future conservation and management as a significant piece of world heritage.

Under these circumstances, the National Research Institute for Cultural Properties (NRICPT) and the Nara National Research Institute for Cultural Properties (NNRICP) have been examining the Bamiyan Buddhist Caves from an architectural viewpoint since 2005. This monograph is the report of this investigation.

The architecture team travelled to Bamiyan for the first time on 10 November 2005. We flew to Kabul, the capital of Afghanistan, via Dubai, and then flew on to Bamiyan. When the team arrived in Bamiyan, it was a fine and cloudless day. The view of the Bamiyan Great Cliff from the Bamiyan airport was too beautiful and magnificent for words. We still remember how much we were impressed in that moment. At the same time we were shocked by the poor condition of the caves in the Bamiyan Great Cliff, the Foladi Valley and the Kakrak Valley. The original purposes of our mission were to establish basic data for conserving and managing the caves as a World Heritage Site, and to evaluate each cave from an architectural viewpoint. We instead realised that the caves were in a far worse condition than we had been led to believe in Japan before we departed. We even thought that the Bamiyan Buddhist Caves could potentially disappear from this world altogether if nothing was done to save them.

We believe that we have to make an effort to accomplish the following four tasks for this site:

1. Understand the present condition of the caves to clarify their current situation and issues for conservation.
2. Academically analyse the site drawing on an extensive examination of the major caves from the viewpoint of architectural history and technique.
3. Assess safety issues as basic data for future conservation projects and public access to the site.
4. Train personnel for conservation projects in the caves.

Although the main focus of this survey was the caves on the Bamiyan Great Cliff, we also attempted to examine the present condition of as many caves as we could enter. We successfully photographed each cave to the east of the West Giant Buddha. Unfortunately, we were not able to finish a detailed survey on all the caves to the west of the West Giant Buddha. We still believe that this photographic data on the caves will be useful for further investigation of the cave remains.

The massive damage to the site, caused by both natural and human-related factors, had an extraordinary impact on us. For example, most of the mural paintings have been lost, along with the awe-inspiring sculptures and reliefs that had adorned the caves. Each element of this site has suffered tremendous losses. Nonetheless, first and foremost we need to protect what remains of the cultural properties for future conservation work and World Heritage Site management.

Fortunately, we have a great deal of experience with cultural property protection and restoration, even though the projects involved properties with different materials and structures. In Japan, the first Cultural Assets Preservation Act was established in 1897, under which we have continued restoration projects on cultural properties. We thus have a significant set of techniques, systems and methodologies for renovation. We need specialists from around the world to cooperate and share their knowledge and experience in order to protect this site, to ensure that the international conservation team continues in the future. We sincerely wish Afghanistan stability and peace.

We must mention that Japan and Afghanistan shared strong Buddhist influences in the past. In the East, Bamiyan is well known as a place that was visited by Xuanzang, an ancient Chinese high priest. When we started this mission, we were very interested in how the place, which Xuanzang must have seen, would seem to us. When we arrived at the Bamiyan airport for the first time, we were very impressed in relation to this question.

It is certain that this common memory will prompt us to carry out further conservation work for the Bamiyan site, although Japan and Afghanistan now have different cultures and histories.

Appendix 1

Cave no.		General plan		Plan		Section		Ceiling		Interior elevation	
Nagoya Univ.	Kyoto Univ.										
	1										
	2										
	3										
	4										
	5										
	6										
	7										
East VI (e)	8	N		N		N					
East VI (c)	9	N		N		N					
East VI (d)		N		N		N					
East VI (a)	10	N		N		N					
East VI (b)		N		N		N					
East V (c)	11	N		N		N					
East V (a)	12	N		N		N					
East V (d)	13	N		N		N					
East V (e)	14	N		N		N					
East V (b)		N		N		N					
East IV (b)	16	N		N		N					
East IV (a)	17	N		N		N					
East III	24			N		N					
East II	25			N	P	N	P		P		P
East I (c)	26	N	P	N	P	N	P		P		
East I (a)	27	N	P	N	P	N	P	N	P		P
East I (b)	28	N	P	N	P	N	P		P		
U	33		P	N	P	N	P		P		P
T	34	N	P	N	P		P				
T	35	N	P	N	P	N	P		P		P
V (d)	38	N		N		N		N			
V (a)	39	N		N		N					
V (c)	40	N		N		N					
V (b)		N		N		N					
	41										
	46										
	48										
G	51			F		F					
	52										
	58										
F (a)	70	N	P	N	P	N	P		P		P
F (b)	71	N	P	N	P	N	P		P		P
F (c)	72	N	P	N	P	N	P	N	P		P
F1(a)	78	N	P	N	P	N	P		P		P

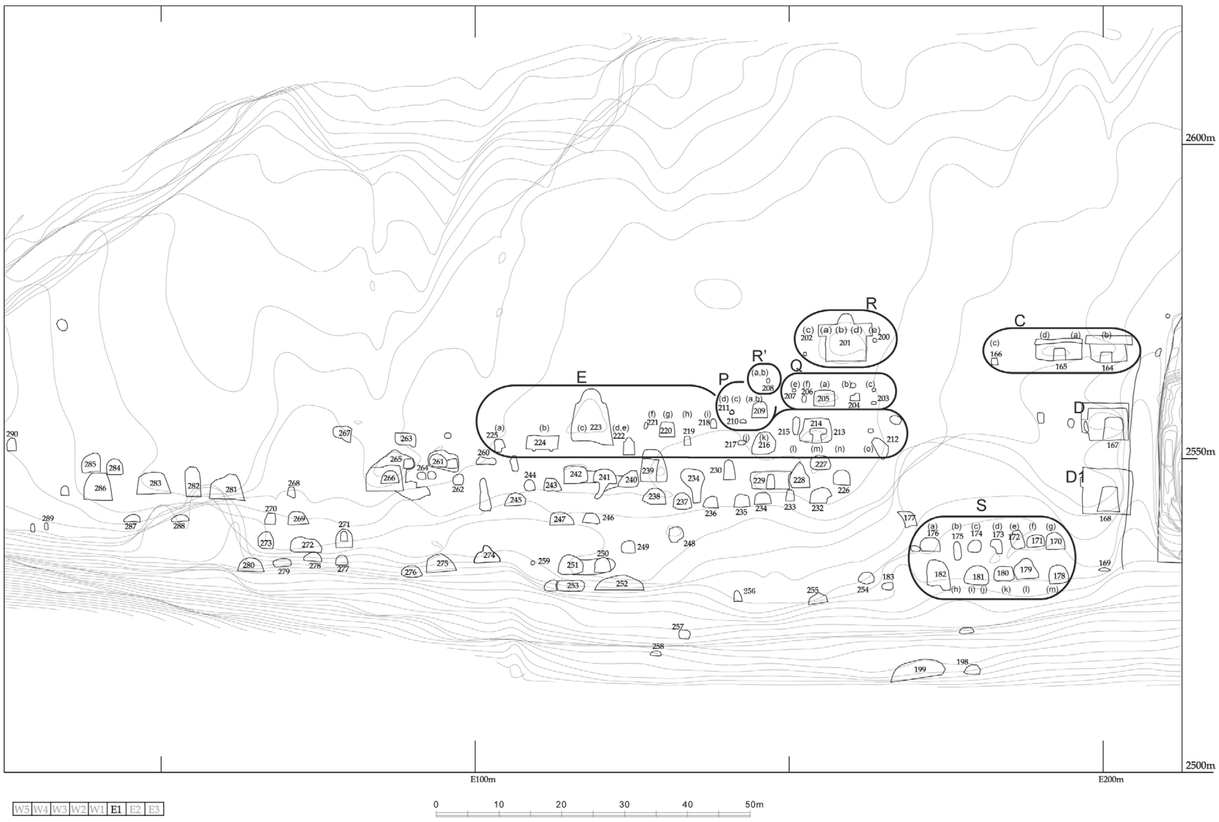
Cave no.		General plan		Plan		Section		Ceiling		Interior elevation	
Nagoya Univ.	Kyoto Univ.										
F1(b)	79	N	P	N	P	N	P		P		P
F3(a)	91	N		N		N					
F3(b)		N		N		N					
F3(c)	90	N		N		N					
F3(d)	89	N		N		N					
F3(e)	88	N		N		N					
F3(f)	92	N		N		N		N			
F3(g)	93	N		N		N		N			
M	111		P	N	P	N	P		P		P
L	114			N		N		N			
A upper (c)	119	N	P	N	P	N	P		P		P
A upper (a)	120	N	P	N	P	N	P	N	P		P
A upper (b)		N	P	N	P	N	P		P		P
A upper (d)	121	N	P	N	P		P				
A upper (e)	122	N	P	N	P		P				
	123										
	124	N		N		N					
A lower (a)	129	N	P	N	P	N	P		P		P
A lower	130	N	P	N	P	N	P		P		P
	134										
	136										
	137			N		N		N			
B (a)	138	N	P	N	P	N	P		P		P
B (b)		N	P	N	P	N	P		P		P
B (c)	139	N	P	N	P		P		P		P
B (d)	140	N	P	N	P	N	P	N	P		P
B (e)	140	N	P	N	P	N	P		P		P
B (f)	141	N		N							
B1 (c)	150	N		N	P	N	P	N			P
B1 (a)	151	N		N		N					
B2 (b)		N		N		N					
B1 (d)	152	N		N		N					
East cave niche	155										
East cave niche (upper)				N		N					
East cave niche (lower)		N									
35-IV	156					N		N			
	157										
35-III	158	N									
35-II	159	N						N			
35-I	160	N						N			
35-V	161	N						N			
35-VI	162	N						N			
35-VII	163										

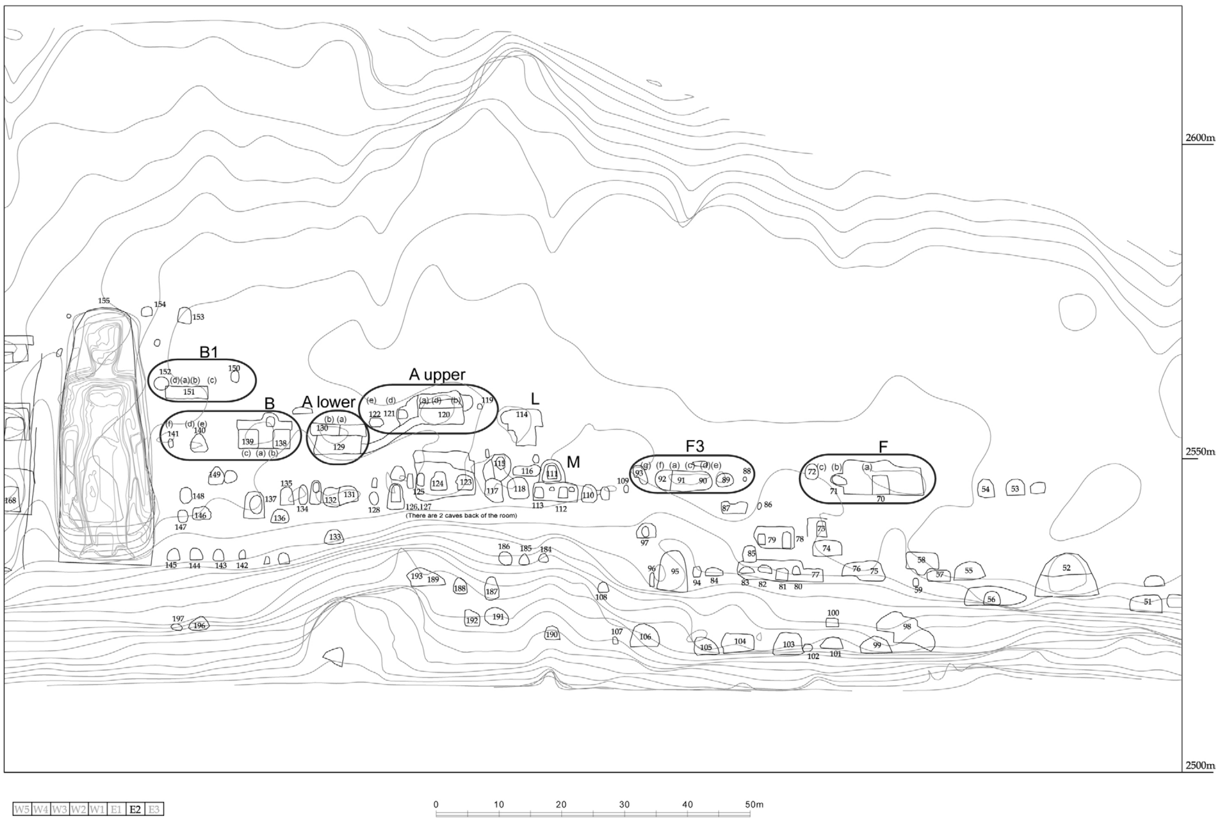
Cave no.		General plan		Plan		Section		Ceiling		Interior elevation	
Nagoya Univ.	Kyoto Univ.										
C (b)	164	N	P	N	P	N	P		P		P
C (a)	165	N	P	N	P	N	P		P		P
C (c)	166	N		N		N					
C (d)		N		N							
D	167			N	P	N	P	N	P		P
D1	168			N	P	N	P		P		P
S (g)	170	N	P	N	P	N	P		P		P
S (f)	171	N	P	N	P	N	P	N	P		P
S (e)	172	N	P	N	P	N	P		P		P
S (d)	173	N	P	N	P	N	P		P		P
S (c)	174	N	P	N	P	N	P	N	P		P
S (b)	175	N	P	N	P	N	P		P		P
S (a)	176	N	P	N	P	N	P	N	P		P
S (m)	178	N		N							
S (l)	179	N		N		N					
S (k)	180	N		N		N					
S (i)	181	N		N		N					
S (j)		N		N		N					
S (h)	182	N		N	P	N	P	N	P		P
R (d)	200	N		N		N					
R (e)		N		N		N					
R (a)		N		N		N					
R (b)	201	N		N		N		N			
R (c)	202	N		N		N					
Q (c)	203	N		N		N					
Q (b)	204	N		N		N					
Q (a)	205	N		N		N					
Q (f)	206	N		N		N					
Q (e)	207	N		N		N					
Q (d)		N		N		N					
53-V	621	N				N		N			
53-IV	622										
53-III	623										
53-II	625										
53-I	626										
53-VI	627										
53-VII	629	N						N			
53-VIII	631										
53-IX	632										
West cave niche (upper)				N		N					
West cave niche (lower)		N									
XVI (a)	700	N		N							
XVI (b)	701	N		N							

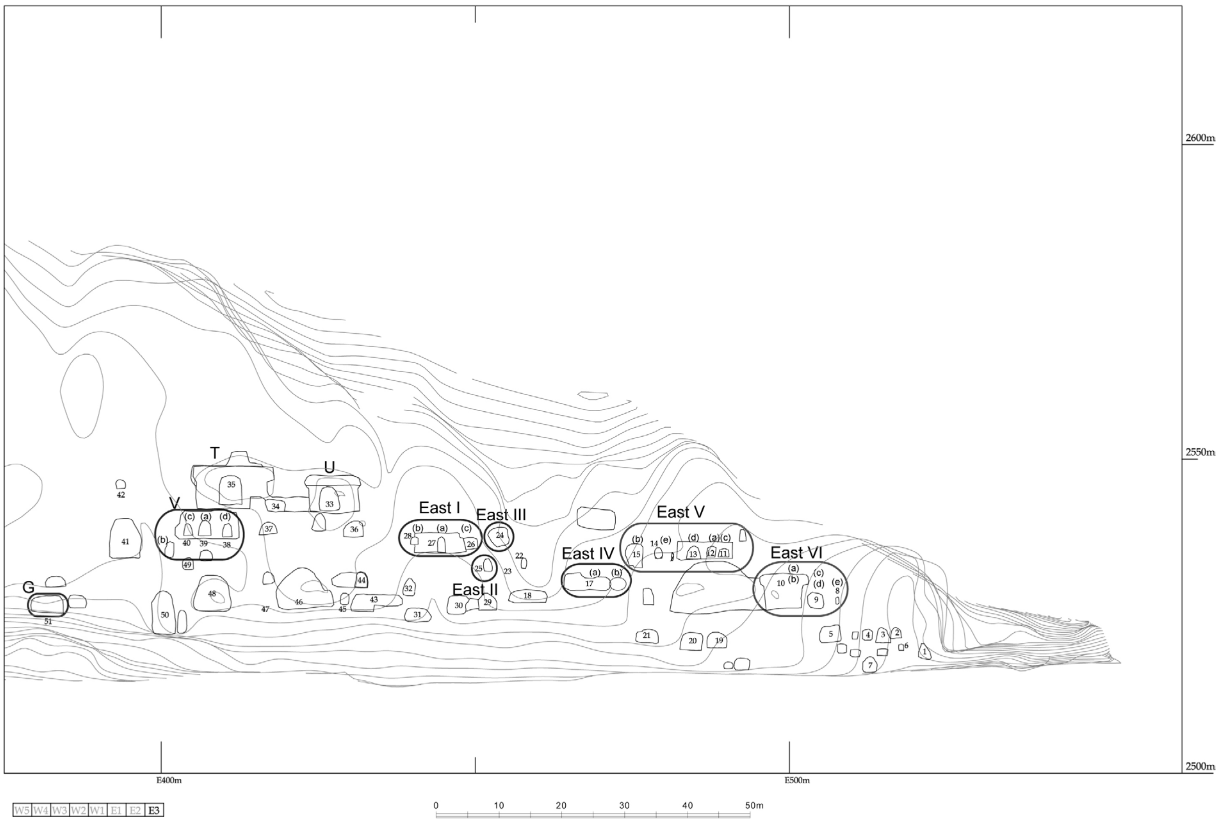
Cave no.		General plan		Plan		Section		Ceiling		Interior elevation	
Nagoya Univ.	Kyoto Univ.										
XVI (c)	702	N		N		N		N			
	732		P		P	N	P		P		P
XV (b)	733	N	P	N	P		P		P		P
XIV (b)	737	N	P	N	P	N	P		P		P
XIV (a)	738	N	P	N	P	N	P		P		P
XII (d)	739	N		N		N					
XII (a)	740	N		N		N					
XII (b,c)	741	N		N		N					
XIII (c)	746	N	P	N	P	N	P	N	P		P
XIII (a)	747	N	P	N	P	N	P		P		P
XIII (b)	748	N	P	N	P	N	P		P		P
Foladi 20				K		K					
Foladi 21				K		K					
Foladi 22				K		K					
Foladi 23				K		K					
Foladi 24				K		K					
Foladi 25 (i)		K		K		K					
Foladi 25 (ii)		K		K		K					
Foladi 25 (iii)		K		K		K					
Foladi 26				K		K					
Foladi 27				K		K					
Foladi 28				K		K					
Foladi 29				K		K					
Foladi 30				K		K					
Foladi 31				K		K					
Foladi 32				K		K					
Kakrak 29		K		K							
Kakrak 30		K		K							
Kakrak 31		K		K							
Kakrak 32		K		K		K					
Kakrak 33											
Kakrak 34				K		K					
Kakrak 35				K		K					
Kakrak 36				K		K					
Kakrak 37				K		K					
Kakrak 38				K		K					
Kakrak 39				K		K					
Kakrak 40				K							
Kakrak 41				K							
Kakrak 42		K				K					
Kakrak 43		K	P		P		P		P		P
Kakrak 44		K	P		P		P		P		P
Kakrak 45		K	P		P		P		P		P

Cave no.		General plan		Plan		Section		Ceiling		Interior elevation	
Nagoya Univ.	Kyoto Univ.										
Kakrak 46				K							
Kakrak 47				K		K					
Kakrak 48				K		K					
Kakrak 49				K		K					
Kakrak 50				K		K					
Kakrak 51				K							
Kakrak 52				K		K					
Kakrak 53											
Kakrak 54											
Kakrak 55				K		K					
Kakrak 56								K			
Kakrak 57				K		K					
Kakrak 58											
Kakrak 59								K			
Kakrak 60				K		K					
Kakrak 61				K		K					
Kakrak 62				K		K					
Kakrak 63				K		K					
Kakrak 64		K		K		K					
Kakrak 65		K		K		K					
Kakrak 66				K		K					
Kakrak 67				K		K					
Kakrak 68				K							
Kakrak 69				K		K					
Kakrak 70				K		K					
Kakrak 71				K		K					
Kakrak 72		K		K							
Kakrak 73		K		K							
Kakrak 74		K		K							
Kakrak 75				K							
Kakrak 76				K							
Kakrak 77				K		K					
Kakrak 78				K		K					
Kakrak 79				K		K					
Kakrak 80				K		K					
Kakrak 81				K		K					
Kakrak Cave-niche				K		K					
Kakrak WT1				K		K					
Kakrak WT2				K		K					
Kakrak WT3				K		K					
Kakrak WT4											
Kakrak WT5				K		K					

Appendix 2


R
R'
P
Q
E
C
D
D1
S
(There are caves)
2600m
2550m
2500m
E100m
E200m
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m


B1
B
A lower
A upper
L
M
F3
F
(There are 2 caves back of the room)
2600m
2550m
2500m
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m


2600m
2550m
2500m
E400m
E500m
T
U
V
G
East I
East II
East III
East IV
East V
East VI
(a)
(b)
(c)
(d)
(e)
1
2
3
4
5
6
7
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10
11
12
13
14
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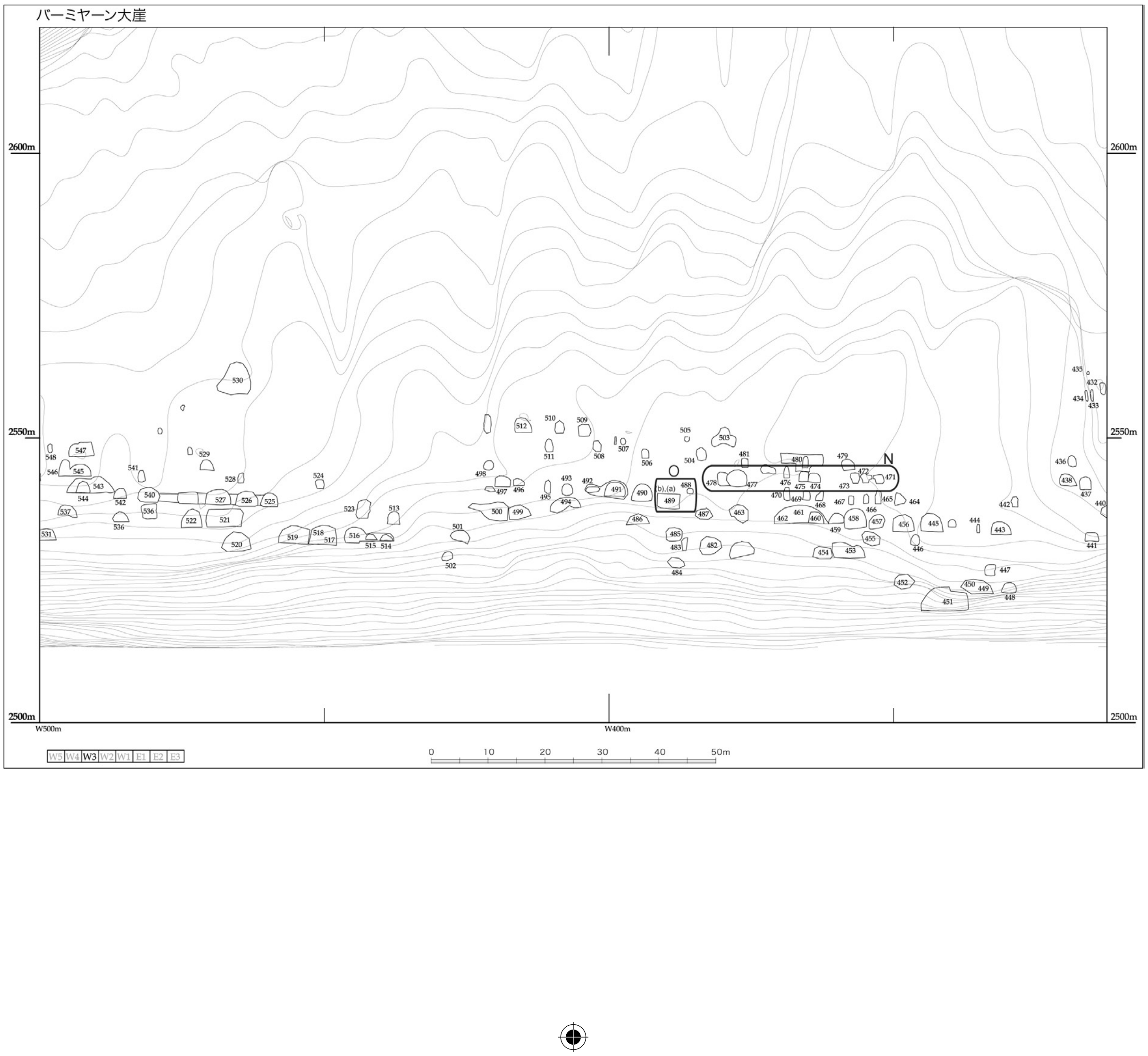
51
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m


バーミヤーン大崖
2600m
2550m
2500m
W500m
W400m
N
O
(b) (a)
431
432
433
434
435
436
437
438
440
441
442
443
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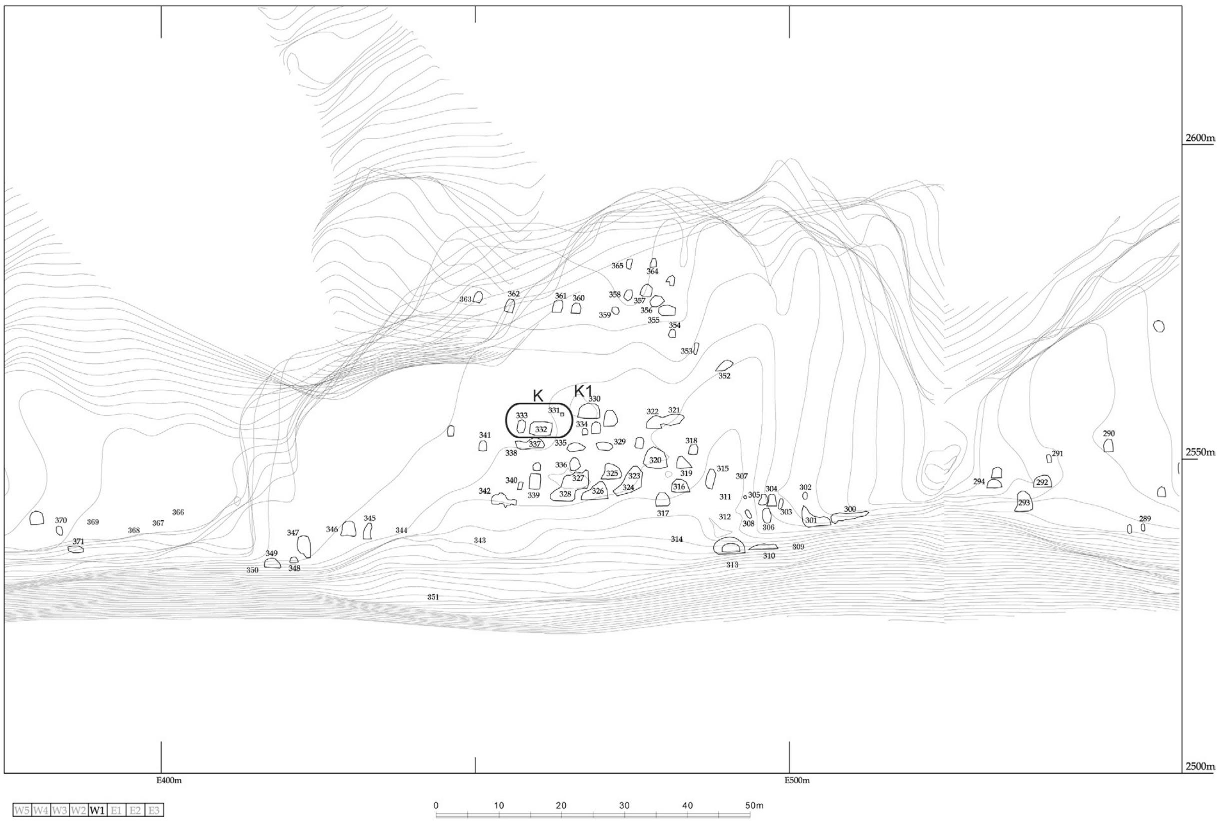
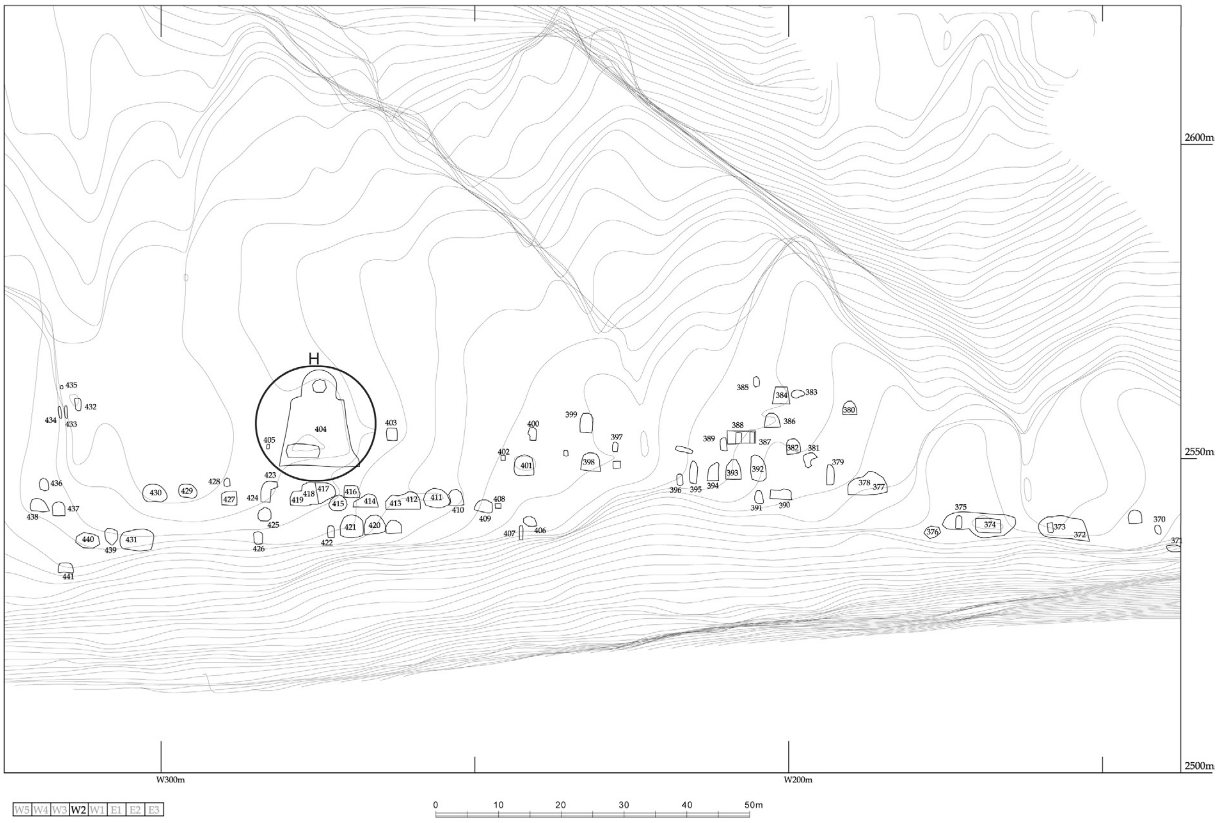
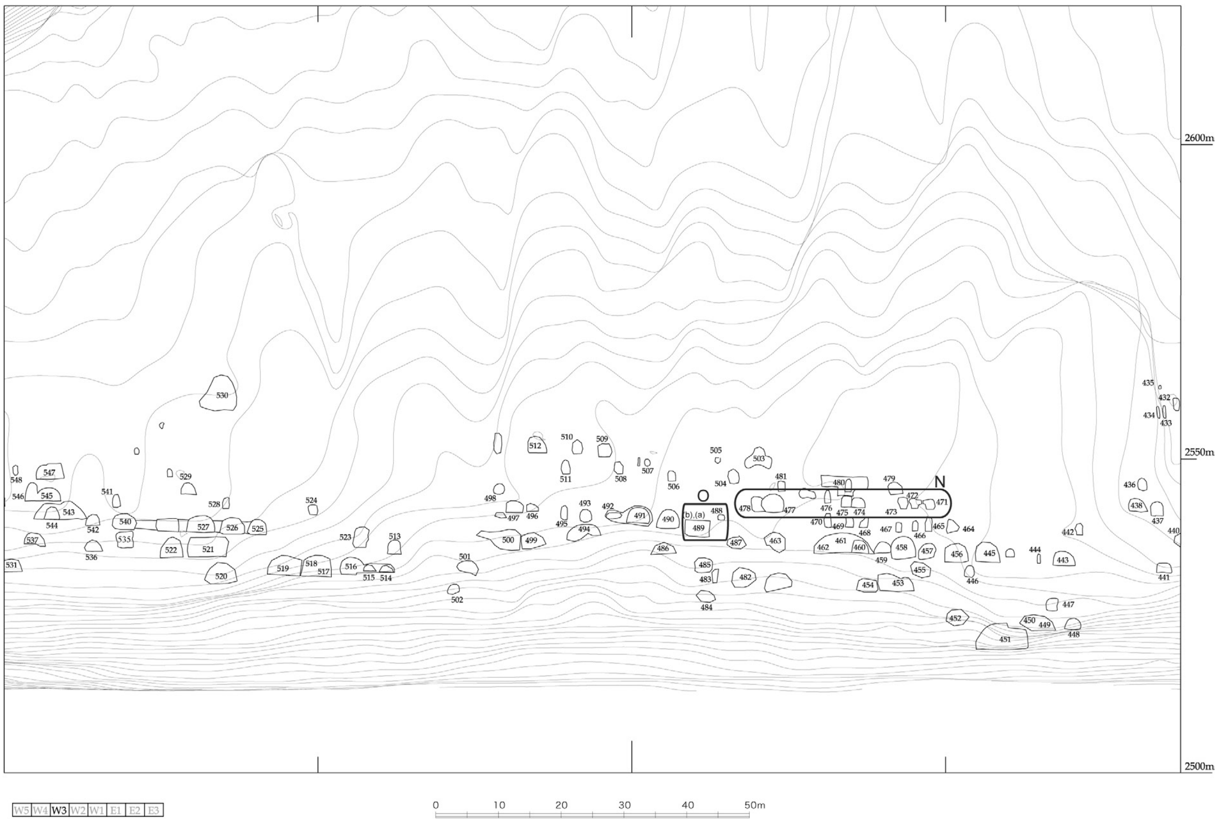
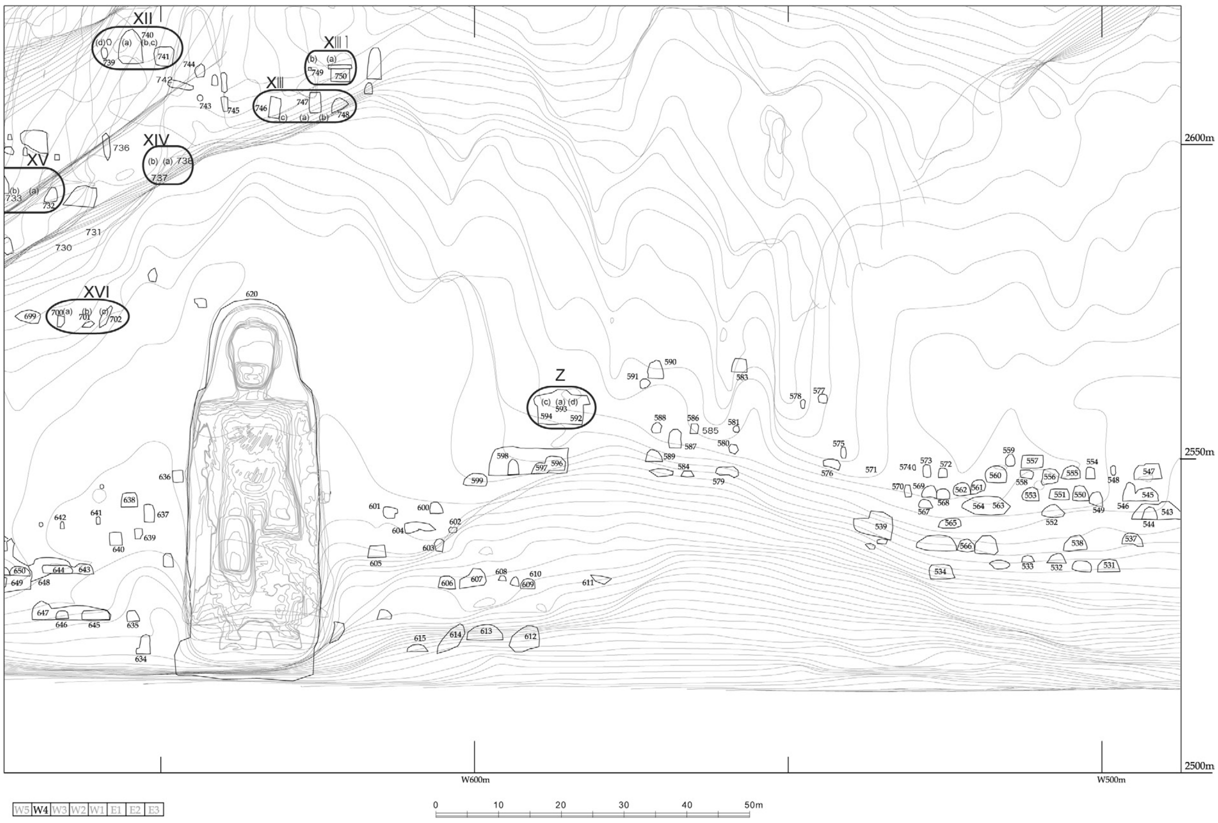
547
548
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m


K
K1
2600m
2550m
2500m
E400m
E500m
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m


H
2600m
2550m
2500m
W300m
W200m
W5 W4 W3 W2 W1 E1 E2 E3
0 10 20 30 40 50m





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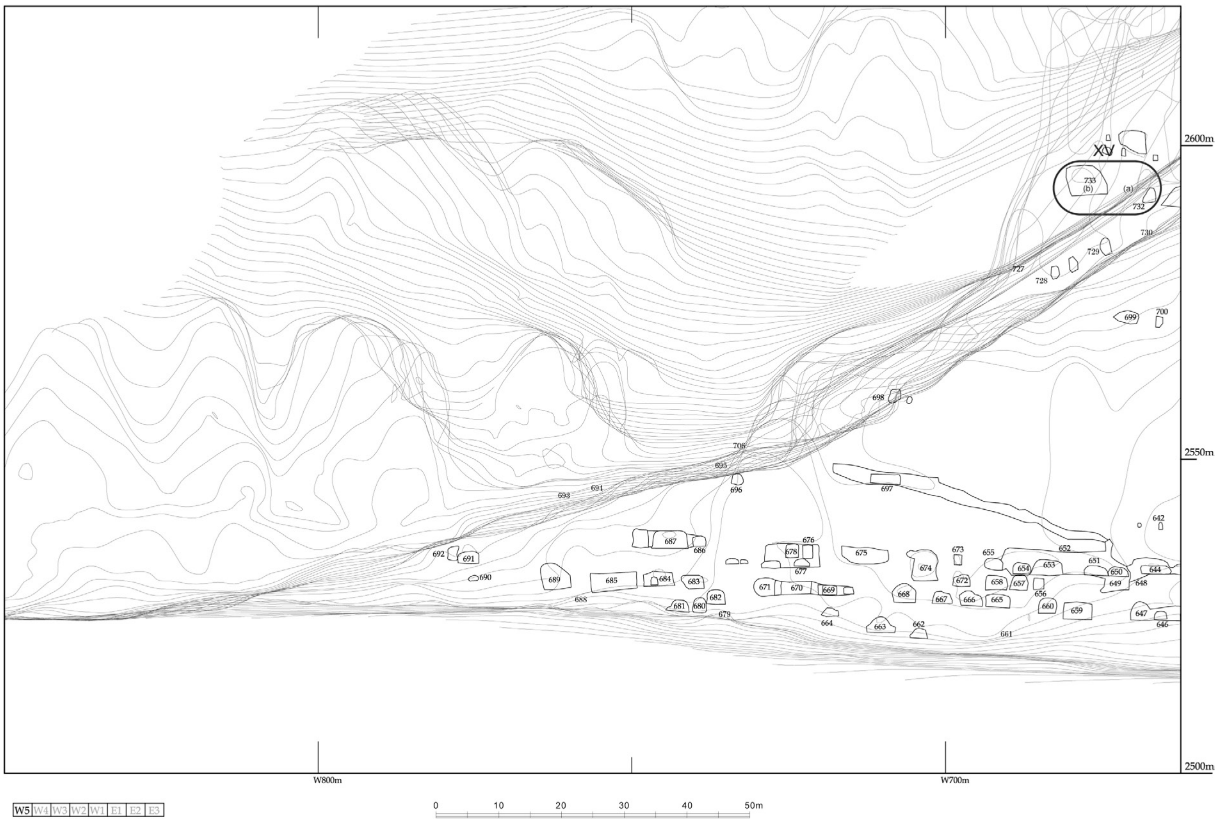
2600m
XV
733
(b)
(a)
732
730
729
727
728
699
700
698
2550m
706
695
694
693
696
697
642
692
691
690
687
686
676
678
677
675
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673
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652
654
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670
669
668
667
672
666
658
657
656
665
660
659
647
646
664
663
662
661
2500m
W800m
W700m
W5
W4
W3
W2
W1
E1
E2
E3
0
10
20
30
40
50m

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